

# The Analysts Journal

VOLUME 13 : NUMBER 1



FEBRUARY 1957

## *In This Issue . . .*

### **Editorial**

The Cleveland Convention . . . . .	5
Contributors . . . . .	6

### **Articles**

The Need for More Complete Cost Data in Annual Reports . . . . .	Sidney M. Robbins	9
Yield on Common Stock Investments . . . . .	Wilford J. Eiteman	13
The Importance of Basic Economic Forces . . . . .	Edmund W. Tabell	19
A Guide to the Federal Government's Indexes of Wholesale Prices . . . . .	Lawrence J. Kaplan	31
Preparing an Oil Share Analyzer . . . . .	Michael Kourday	39
Securities Market Levels Today and the Outlook for 1957 . . . . .	C. Austin Barker	45
Electronic Computers and Their Place in Securities Analyses . . . . .	Lawrence Rosenfeld	51
A "Character of the Market Method" Is Facing a Crucial Test . . . . .	Marc de Goumois	55
Regional Convention of the New York Society of Security Analysts:		
Aircraft and Guided Missiles . . . . .		61
Atomic Energy . . . . .		65
Luncheon . . . . .		71
Construction . . . . .		79
Non-Ferrous Metals . . . . .		83
Petroleum . . . . .		87
Public Utilities . . . . .		93
Transportation . . . . .		101

### **Departments**

Book Reviews . . . . .	Helen Slade	108
------------------------	-------------	-----

*Published by*

THE NATIONAL FEDERATION OF FINANCIAL ANALYSTS SOCIETIES

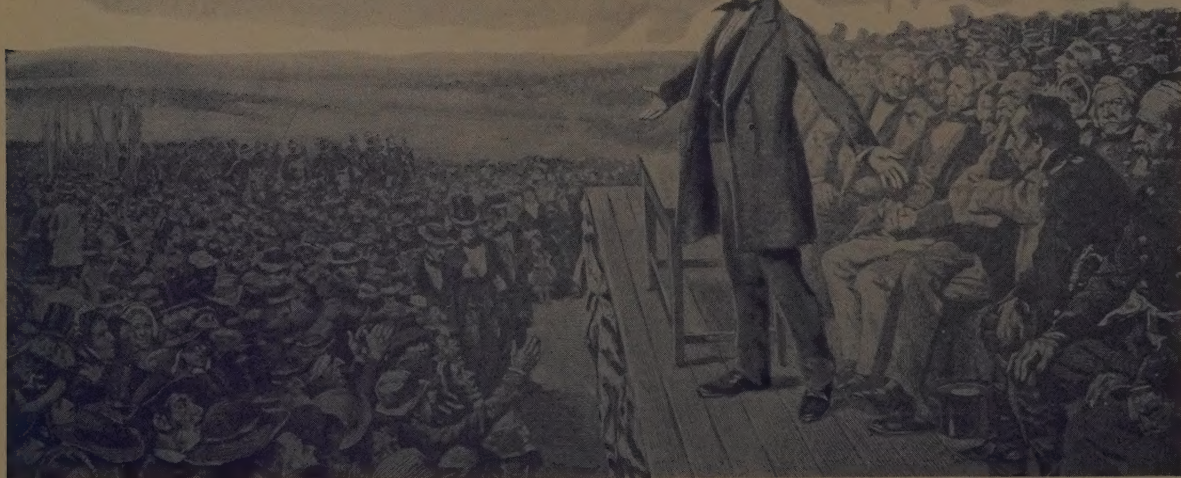


## 3 minutes... and 7 days

Three minutes . . . and Lincoln had delivered his immortal Gettysburg Address.

But a week . . . and more . . . passed before all the nation learned of it.

Today, the magic of modern telephone service links newsmen to press, TV, radio . . . gives us history as it happens.



*"Lincoln's address at Gettysburg" reprinted from Harper's Weekly Feb. 10, 1900*



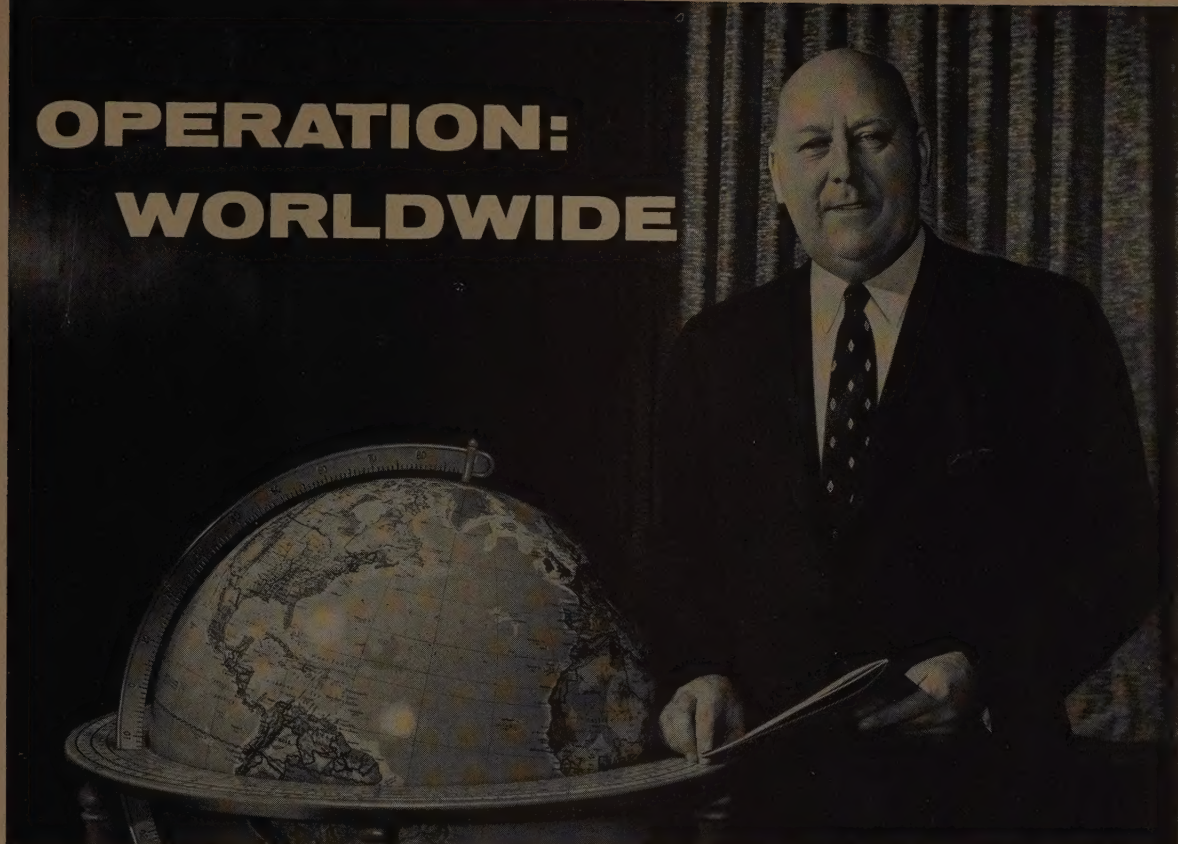
# GENERAL TELEPHONE SYSTEM

ONE OF AMERICA'S GREAT TELEPHONE SYSTEMS

• 260 MADISON AVENUE, NEW YORK, N. Y.



# OPERATION: WORLDWIDE



Mr. Harold Blancke, President, Celanese Corporation of America

Through two great new affiliates, Celanese Corporation of America now delivers its products—and its skills—to the ends of the earth.

“Celanese has now embarked on an export program that eclipses all of our considerable efforts in this area.

In doing so we recognize not only the great potential of these markets, but the unique advantages Celanese brings to them.

As a leading producer of chemicals, plastics and textile raw materials, Celanese can supply all overseas markets quickly—and in quantity.

Above all, Celanese has one invaluable export—the experience and talents of our technical per-

sonnel. It is available to everyone—everywhere.

Representing Celanese in this major undertaking are two firms—AMCEL CO., INC., serving Asia, Europe, Africa and Australia and PAN AMCEL CO., INC., serving Latin American countries and Canada.

We are especially fortunate in having as representatives in 42 countries of the world, men and firms of the highest character. They are ‘Operation: Worldwide’s’ assurance of success.”

PRESIDENT

Arnel® Celaperm® Fortisan®

## THESE PRODUCTS OF CELANESE CORPORATION OF AMERICA ARE NOW AVAILABLE:

**CHEMICALS:** Acids, Alcohols, Aldehydes, Anhydrides, Esters, Glycols, Ketones, Polyols, Vinyl Monomers, Plasticizers, Gasoline Additives, Functional Fluids.

**TEXTILES:** Acetate filament and staple, Celaperm (solution-dyed acetate), Arnel (triacetate) filament and staple, Fortisan Fortisan-36 (high strength rayons), Rayon. **CELLULOSE ACETATE FLAKE.**

**PLASTICS:** Cast and Extruded Acetate Film & Sheet, Cellulose Acetate Molding Compounds, Cellulose Propionate Molding Compounds, Polyvinyl Acetate Emulsions. **POLYESTER RESINS.**

**CELANESE CORPORATION OF AMERICA, 180 MADISON AVENUE, NEW YORK 16, N. Y.**



# CELOTEX

REG. U.S. PAT. OFF.

## 1956—A RECORD SALES YEAR

Net sales in fiscal 1956 were up 7 per cent from those of 1955 and represented a new company record for the fourth consecutive year. Net earnings increased 16 per cent; after preferred dividends they were equal to \$6.42 a share as against 1955 earnings of \$5.49. Dividends of \$2.40 a share were paid on common stock, up from \$1.75 a share the year before.

Construction was begun on three new plants, at L'Anse, Michigan, Fort Dodge, Iowa, and Pittston, Pennsylvania. These additions will increase productive capacity in our established lines of insulating fiberboards, acoustical materials and gypsum products.

When in operation, our three new plants should enable us to better and more economically serve our customers and to further increase the profit potential of our company.

*O. B. Mansell*  
PRESIDENT

### COMPARATIVE STATEMENT OF INCOME

FOR THE YEARS ENDED OCTOBER 31,  
1956 1955

NET SALES .....	\$76,467,119	\$71,136,590
COSTS AND EXPENSES:		
Cost of sales and selling and administrative expenses ..	62,059,542	57,958,129
Provision for depreciation and depletion .....	2,319,643	2,085,338
TOTAL COSTS AND EXPENSES .....	64,379,185	60,043,467
INCOME FROM OPERATIONS...	12,087,934	11,093,123
OTHER INCOME (net) .....	(55,650)	13,520
INCOME BEFORE INCOME TAXES .....	12,032,284	11,106,643
PROVISION FOR INCOME TAXES ..	6,130,000	6,025,000
NET INCOME FOR THE YEAR..	\$ 5,902,284	\$ 5,081,643

### ASSETS

AS OF OCTOBER 31,  
1956

CURRENT ASSETS:	
Cash and U. S. Government securities.....	\$20,312,590
Accounts receivable (net) .....	8,688,624
Inventories .....	6,702,255
TOTAL CURRENT ASSETS.....	35,703,469
PROPERTY, PLANT AND EQUIPMENT.....	57,493,958
Less: Accumulated depreciation and depletion.....	21,875,794
NET PROPERTY, PLANT AND EQUIPMENT .....	35,618,164
SECURITIES AND MISCELLANEOUS INVESTMENTS, ETC. ....	1,491,846
PREPAID EXPENSES AND DEFERRED CHARGES.....	852,892
TOTAL ASSETS .....	\$73,666,371

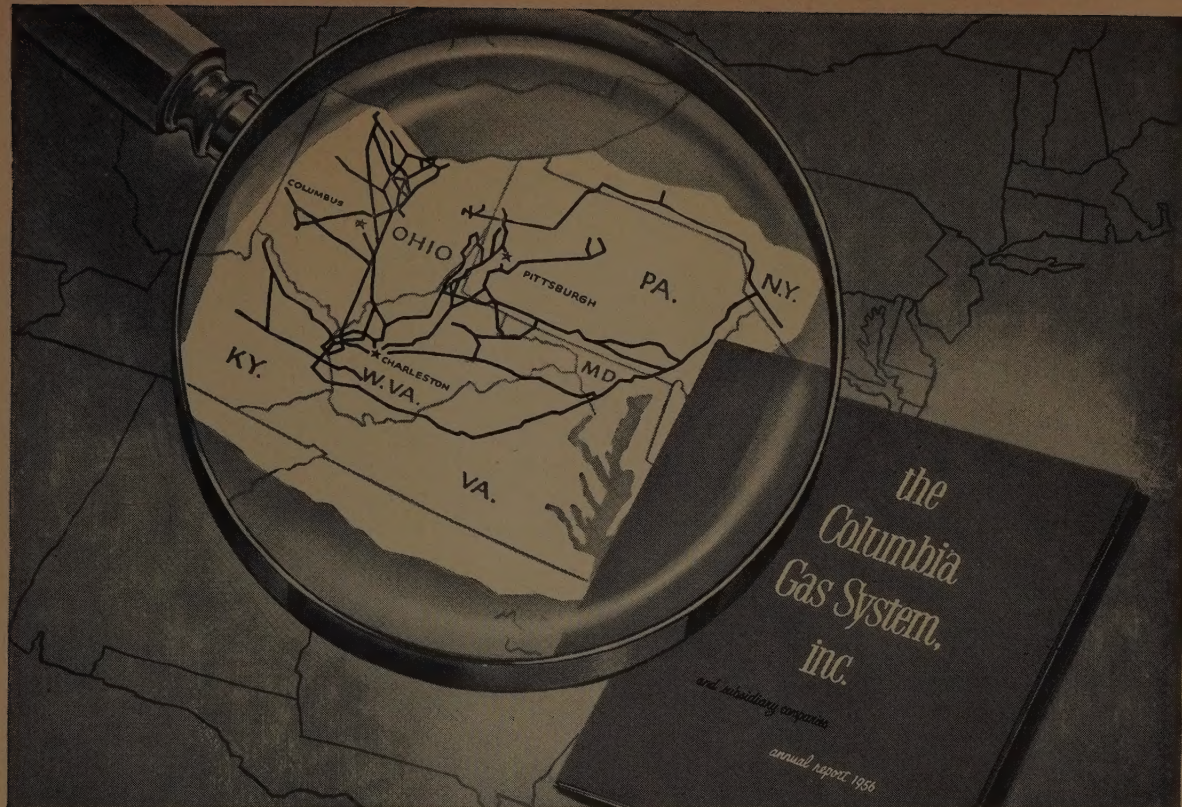
### LIABILITIES, CAPITAL STOCK AND SURPLUS

CURRENT LIABILITIES:	
Accounts payable .....	\$ 3,639,506
Accrued expenses .....	1,859,248
Provision for taxes (less U. S. Treasury obligations) .....	781,754
Payments on long-term debt due within one year .....	950,000
TOTAL CURRENT LIABILITIES.....	7,230,508
LONG-TERM DEBT DUE AFTER ONE YEAR.....	23,300,000
DEFERRED FEDERAL INCOME TAXES.....	370,000
NET WORTH:	
Preferred stock .....	5,137,250
Common stock .....	878,651
Paid-in surplus .....	6,325,253
Earned surplus .....	30,424,709
TOTAL NET WORTH.....	42,765,863
TOTAL LIABILITIES AND NET WORTH .....	\$73,666,371



Copies of our Annual Report for the fiscal year ended October 31, 1956, are available upon request. Write to Secretary, The Celotex Corporation, 120 South La Salle Street, Chicago 3, Illinois.





## Columbia Gas System Reports From a Very Special Part of America

In 1956, Columbia Gas System delivered more gas to more people than ever before . . . another year of growth and another year of service in a very special part of the country . . . the Heartland of American commerce and industry.

Natural gas was first discovered here. The complex techniques for its distribution were developed here. In this area many of the fields that once produced much of the country's original natural gas have been turned into vast underground storage reservoirs.

One-fourth of the nation's storage gas is held here by the System for use in the winter months, assuring a nearby supply of low-cost versatile fuel. Families here on the average use more natural gas per household than in any other section of the country.

From year to year, expanding industry has required more of this ideal fuel.

And from year to year, Columbia Gas System has grown to meet the needs of 3 million of the natural gas users in this growing, dynamic region.

For details of Columbia's latest and greatest year of service, write for the Annual Report for 1956.

### THREE-YEAR SUMMARY OF EARNINGS

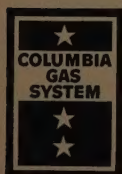
	1956	1955	1954
Net Income	\$29,688,000	\$21,307,000	\$18,621,000
Dividends on Common Stock	\$18,544,000	\$17,316,000	\$16,200,000
Retained in Business	\$11,144,000	\$ 3,991,000	\$ 2,421,000
Income Per Share	\$1.44	\$1.08	\$1.03
Dividends Paid Per Share	\$0.92 1/2	\$0.90	\$0.90
(Current Annual Dividend Rate—\$1.00 per share.)			

*serving homes and industry in America's Heartland*

## THE COLUMBIA GAS SYSTEM, INC.

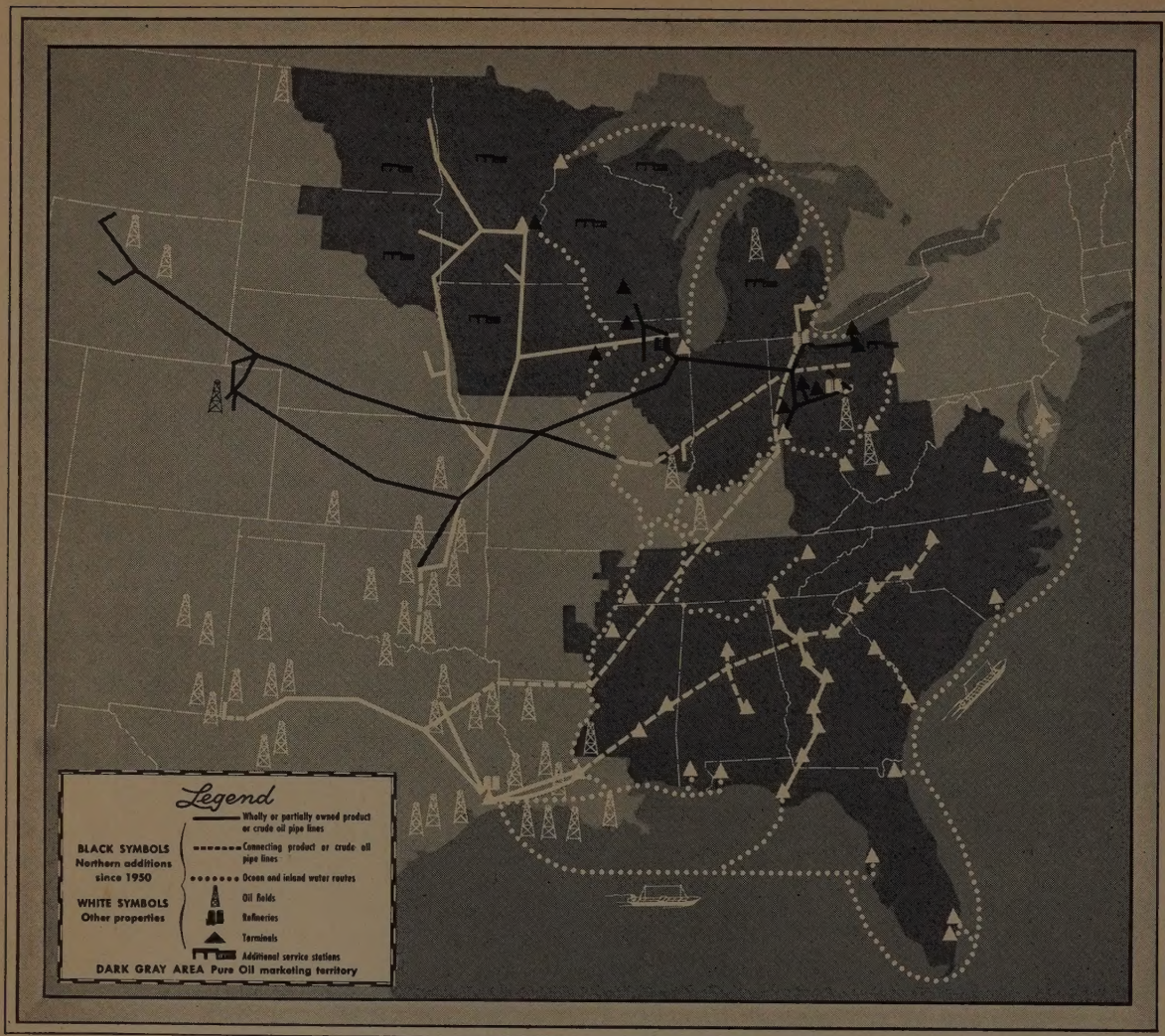
COLUMBIA GAS SYSTEM SERVICE CORPORATION

120 East 41st Street, New York 17, N.Y.



**CHARLESTON GROUP:** United Fuel Gas Company, Amere Gas Utilities Company, Atlantic Seaboard Corporation, Central Kentucky Natural Gas Company, Virginia Gas Distribution Corporation, Kentucky Gas Transmission Corporation—**COLUMBUS GROUP:** The Ohio Fuel Gas Company—**PITTSBURGH GROUP:** The Manufacturers Light and Heat Company, Binghamton Gas Works, Cumberland and Allegheny Gas Company, The Keystone Gas Company, Inc., Home Gas Company





# Look what's been added to the Pure Oil picture

Since 1950, Pure Oil has added the equivalent of a completely integrated oil company to the Northern segment of its operations.

In just six years, important production in Colorado, interests in eight pipe lines, a complete refinery, and nine terminals have been added. And through the acquisition of the W. H. Barber Company and Benzoco, and the conversion of the Hickok Oil Corporation, more than 2,300 additional PURE station outlets now serve an increasing number of motorists in the North.

This remarkable growth brings greater efficiency and economy in a key area of PURE's operations. Matter of

fact, a great surge of growth and progress is being experienced throughout the entire Pure Oil operating area . . . expanded production, increased refinery capacity, added transportation facilities, more modern marketing outlets, continued product research and development.

These are the signs of a healthy, vigorous and progressive business . . . the planning of a forward-looking oil company.

## THE PURE OIL COMPANY

Producers • Refiners • Transporters  
Marketers

35 EAST WACKER DRIVE • CHICAGO 1, ILLINOIS

Now, more than ever... Be sure with PURE





# The Analysts Journal

FEBRUARY  
1957

## The Cleveland Convention

PIERRE R. BRETEY

*Editor*

May 19 to 23

HELEN SLADE

*Managing Editor*

JEREMY C. JENKS

SAMUEL B. JONES

ROBERT J. WILKES

*Associate Editors*

A. HAMILTON BOLTON

SHELBY CULLOM DAVIS

RUSSELL J. EDDY

EDWARD DOUGLAS HOWARD II

RICHARD W. LAMBOURNE

M. DUTTON MOREHOUSE

*Advisory Committee*

JOHN STEVENSON

*Business Manager*

GEORGE M. HANSEN

*Advertising Manager*

VOLUME 13  
NUMBER 1

GILBERT PALMER, David Watterson, Harvey Stroud and Edward McNelly, with all members of the Cleveland Society, are arranging a notable convention.

The first day's activities include a unique provision. Mr. Palmer tells of a railroad trip for the entire convention to tour industrial Cleveland. This will be by special train, with representatives of heavy industries to act as hosts and point out features of note. Stops to permit comprehensive examination conducive to a thorough understanding of the corporations are scheduled.

Present plans include a visit to the Erie docks and a "Stouffer box lunch." A Hewlitt unloader at the docks will be an unforgettable spectacle. Visits to other plants by train, terminating "at a Republic ore boat site," where cocktails are to be served, will conclude the first day.

The annual dinner is to be held on Wednesday, May 22, after a day of forums and trips. Apparently this convention differs from most others since it provides an abundance of first-hand investigation possibilities as well as purely intellectual stimulation. It promises to be well worth attending.

---

THE ANALYSTS JOURNAL is published five times a year, in February, May, June, August, and November, by The National Federation of Financial Analysts Societies, a nonprofit voluntary association devoted to the interests of those engaged in investment management and, more specifically, in the profession of security analysis. Publication office: National Federation of Financial Analysts Societies Headquarters, 444 Madison Avenue, New York 22, N. Y. Re-entered as second-class matter March 4, 1953, at the Post Office at New York, N. Y., under the Act of March 3, 1879.

COPYRIGHT 1957 by the National Federation of Financial Analysts Societies. Printed in the United States of America. Articles may be reprinted only by permission of the Editors.

EDITORIAL COMMUNICATIONS AND ARTICLES FOR PUBLICATION should be addressed to Helen Slade, managing editor, 400 East 57 Street, New York 22, N. Y. Neither the Federation nor the editorial staff is responsible for the facts or opinions contained in articles appearing in THE ANALYSTS JOURNAL.

ADVERTISING: Address advertising communications, plates, etc., to Grant Webb & Company, 509 Madison Avenue, New York 22, N. Y. Phone MUrray Hill 8-7350.

ANNUAL SUBSCRIPTION price for five issues \$5; foreign subscription \$5.50; single copies are \$1.50, foreign \$1.75. Checks should be drawn to the order of THE ANALYSTS JOURNAL and forwarded to 444 Madison Avenue, New York 22, N. Y.



# The National Federation of Financial Analysts Societies

## Officers

ROBERT J. WILKES  
President

GILBERT H. PALMER  
Executive Vice-President

GEORGE M. HANSEN  
Treasurer

## Executive Committee

ROBERT J. WILKES, Chairman

SHELBY CULLOM DAVIS

GEORGE M. HANSEN

SAMUEL B. JONES

M. DUTTON MOREHOUSE

GILBERT H. PALMER

## Committee Chairmen

GEORGE M. SHANNON  
Admissions

PIERRE R. BRETEY  
Analysts Journal

JOHN HARDY WEEDON  
Constitution

RICHARD W. LAMBOURNE  
Convention

WILLIAM W. WOLBACH  
Corporate Information

JAMES McNAB  
Directory

MERWIN H. WATERMAN  
Education

M. DUTTON MOREHOUSE  
Government Relations

JEREMY C. JENKS  
Insurance

HELEN SLADE  
Placement

A. MOYER KULP  
Professional Ethics  
and Standards

WILLIAM C. NORBY  
Board of Regents, Invest-  
ment Analysts Seminar

# Contributors to This Issue

*C. Austin Barker* is secretary of the finance committee of the board of directors of the Cleveland Electric Illuminating Company. He is an authority on market trends and monetary impacts on the economy.

*Wilford J. Eiteman*, professor of finance in the School of Business Administration of the University of Michigan, is author of a number of books and articles. Among his contributions is "The Stock Market," written with C. A. Dice, which is one of the most distinguished books on the subject.

*Marc de Goumois*, technical consultant to Kalb, Voorhis & Co., has written articles on financial subjects and stock market trends.

*Lawrence J. Kaplan*, chief information officer, New York Regional Office, Bureau of Labor Statistics, has the responsibility of analyzing the Bureau's statistical data. He is a lecturer on productivity statistics and economics.

*Michael Kourday*, head of the research department and oil analyst for Hayden, Stone & Co., is an authority on petroleum. He has served as oil analyst for E. F. Hutton & Co. His articles have appeared in leading publications.

*Sidney M. Robbins*, formerly of the National Bureau of Economic Research, has been security analyst for Bache & Co. and economist for the United States Treasury Department. He is professor of finance and chairman of the Department of Finance of the University of Toledo. On leave this year, he is visiting professor of finance at Columbia University.

*Lawrence Rosenfeld*, head of Operations Research and Mathematical Service of Melpar, Inc., is a foremost statistical mathematician. He is an expert in scientific and industrial problems concerning production scheduling, investment problems, and computer applications. He has written many articles on applied mathematic and computer implementation.

*Edmund W. Tabell*, director of institutional research for Walston & Co., Inc., has long been known as one of the leading security analysts and financial economists. He is author of articles on investment trends and a lecturer in this field.

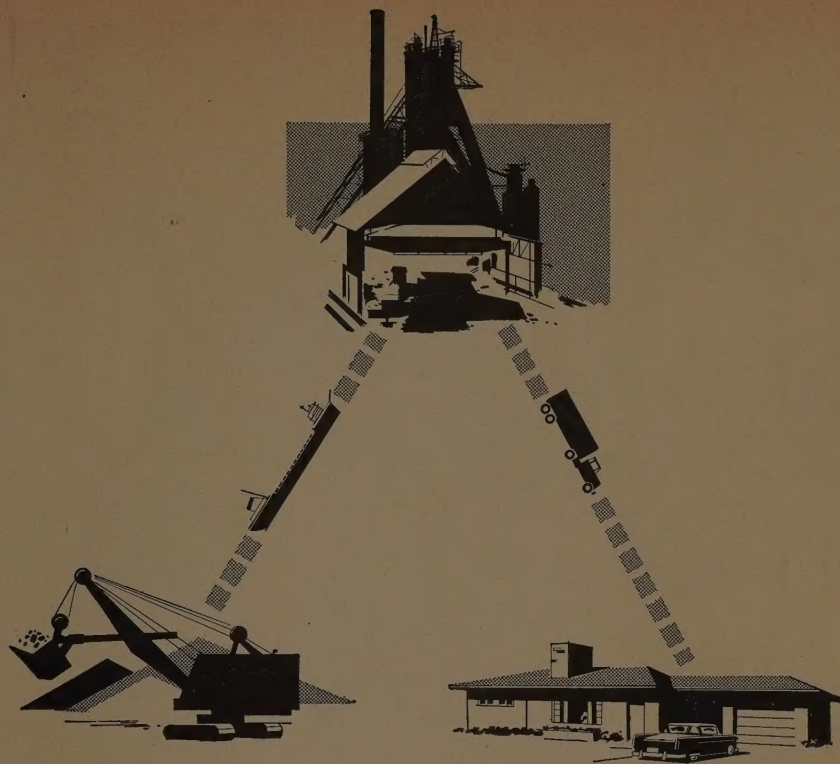
## Vice-Presidents

CHARLES T. BAUER  
THOMAS JOHNSON  
STANFORD O. EGE  
JOHN S. WATTERSON, JR.  
GEORGE S. ROOKER  
GEORGE B. FISHER  
LAWRENCE M. GOODSPEED  
HAL KENNEDY  
L. HARTLEY SMITH  
J. R. PETRIE  
W. STURGIS MACOMBER  
GEORGE H. NORTON, JR.  
OSBORNE R. ROBERTS  
WILLARD B. VAN HOUTEN  
WALTER W. CRAIGIE  
HENRY T. MALJGREN  
J. F. HALLETT  
H. TAYLOR PEERY  
ALBERT G. LANG  
GEORGE C. POWER, JR.  
NELSON J. FOSTER

## Societies

THE BALTIMORE SECURITY  
ANALYSTS SOCIETY  
THE BOSTON SECURITY  
ANALYSTS SOCIETY  
THE INVESTMENT ANALYSTS  
SOCIETY OF CHICAGO  
THE CLEVELAND SOCIETY  
OF SECURITY ANALYSTS  
THE DALLAS ASSOCIATION  
OF INVESTMENT ANALYSTS  
DENVER SOCIETY  
OF SECURITY ANALYSTS  
THE FINANCIAL ANALYSTS  
SOCIETY OF DETROIT  
KANSAS CITY SOCIETY  
OF FINANCIAL ANALYSTS  
THE LOS ANGELES SOCIETY  
OF SECURITY ANALYSTS  
MONTREAL INSTITUTE  
OF INVESTMENT ANALYSTS  
THE NEW YORK SOCIETY  
OF SECURITY ANALYSTS  
OMAHA-LINCOLN SOCIETY  
OF FINANCIAL ANALYSTS  
FINANCIAL ANALYSTS  
OF PHILADELPHIA  
THE PROVIDENCE SOCIETY  
OF FINANCIAL ANALYSTS  
THE RICHMOND SOCIETY  
OF FINANCIAL ANALYSTS  
THE ROCHESTER SOCIETY  
OF INVESTMENT ANALYSTS  
THE ST. LOUIS SOCIETY  
OF FINANCIAL ANALYSTS  
THE SECURITY ANALYSTS  
OF SAN FRANCISCO  
THE SECURITY ANALYSTS  
ASSOCIATION OF TORONTO  
TWIN CITIES SOCIETY  
OF SECURITY ANALYSTS  
THE WASHINGTON SOCIETY  
OF INVESTMENT ANALYSTS





# Republic Steel's

## expanded raw material reserves round out "mine to market" integration

Expansion of ore, coal and limestone reserves will provide Republic with ample raw materials for generations to come . . . An important fact, when you consider that the steel-making recipe calls for three tons of raw materials for every ton of finished steel.

With the approaching decline of supply of high-grade ore from the Mesabi Range, Republic has concentrated on the up-grading of lean domestic ores—like taconite rock—and the acquisition of the rich ores from Labrador and Liberia. These recent sources combined with productive mines in Alabama, Michigan, Minnesota and New York will supply Republic with ore reserves

that run into the hundreds of millions of tons.

Coal reserves from Republic mines in Pennsylvania, West Virginia, Kentucky and Alabama are sufficient for years.

The third ingredient in the steel recipe, limestone, presently comes from quarries at Presque Isle, Michigan, in which Republic has a large interest, backed up by a second wholly owned reserve just across Lake Erie from Cleveland. These limestone deposits are adequate for generations.

Virtually unlimited raw material reserves, steel plants, and manufacturing divisions round out Republic's "mine-to-market" integration.

**REPUBLIC STEEL** GENERAL OFFICES: CLEVELAND 1, OHIO

*Where diversification means stability*





(Left to right) Dr. John Bardeen\*, Dr. William Shockley\* and Dr. Walter H. Brattain, shown at Bell Telephone Laboratories in 1948 with apparatus used in the early investigations which led to the invention of the Transistor.

## *Bell Telephone System Salutes Three New Nobel Prize Winners*

Drs. John Bardeen, Walter H. Brattain and William Shockley  
are honored for accomplishments at the Bell Telephone Laboratories

The 1956 Nobel Prize in Physics has been awarded to the three inventors of the Transistor, for "investigations on semiconductors and the discovery of the transistor effect."

They made their revolutionary contribution to electronics while working at Bell Telephone Laboratories in Murray Hill, N. J. Discovery of the Transistor was announced in 1948. We are proud to have been able to provide the environment for this great achievement.

This is the second Nobel Prize awarded to Bell Telephone Laboratories scientists. In 1937 Dr. C. J. Davisson shared a Nobel Prize for his discovery of electron diffraction.

Such achievements reflect honor on all the scientists and engineers who work at Bell Telephone Laboratories. These men, doing research and development in a wide variety of fields, are contributing every day to the improvement of communications in America.

*\*Dr. Bardeen is now with the University of Illinois, and Dr. Shockley is with the Shockley Semiconductor Laboratory of Beckman Instruments, Inc., Calif.*



**BELL TELEPHONE SYSTEM**



# The Need for More Complete Cost Data in Annual Reports

SIDNEY M. ROBBINS

IN ORDER TO GUIDE an enterprise successfully, management must make advance decisions concerning probable future sales volume and the costs of operating at these levels. It establishes profit objectives based upon such investigations and develops budgets to insure that the various activities of a company are integrated into a common plan for attaining these goals. In his efforts to ascertain the outlook of different companies, the security analyst also makes estimates of probable future sales volume. To translate these forecasts into profits, he appraises cost patterns and works out certain financial ratios. Like management, he conducts studies to check a company's prospects and may undertake a first-hand evaluation of plant operations to get a better insight into manufacturing efficiencies.

Thus, an emphasis on future results marks the studies of both management and security analysts. In carrying out its activities, management has access to all the internal records of a firm while the security analyst must rely largely on published data and on calculated estimates where statistical gaps exist. To an increasing degree, management is discovering that the existence of a well-informed body of security holders' representatives is an element of organizational strength. Reflecting this viewpoint, it has provided information helpful in gauging a company's outlook that it formerly withheld. Despite this more enlightened attitude, management for the most part has failed to release in any form a growing volume of detailed cost statistics that have been found of great value for analytic purposes.

## THE NEW TREND IN MANAGEMENT PLANNING

Traditionally, accounting is concerned with the recording of profits rather than with their analysis. The emphasis is on total costs which applies all direct and indirect manufacturing charges to value inventories and the cost of goods sold. When costs are lumped in this fashion, the effect of changes in capacity or the product-mix on profits is obscured, because the individual items of costs do not vary with output in the same way.

To offset this deficiency, a new form of management accounting has been introduced that centers on determining the relationship between volume, costs, and profits. These studies have shifted the focus of attention from full-cost to marginal analysis. In this approach, costs are broken down into those that vary with volume and those that remain unchanged regardless of the level of output. By establishing the relationship between volume and costs at different levels of output, profit forecasting is facilitated. Management has also learned that decisions on product or price alternatives require an understanding of differential rather than aggregate costs.

## THE DATA NECESSARY FOR MARGINAL INCOME ANALYSIS

The basis of marginal income investigations is an accurate classification of a company's costs. Every business

sells a product and expends money in the process of doing so. Some of these expenditures are incurred because a company must keep a portion of its physical facilities and personnel intact no matter how low business drops unless it is contemplating liquidation. Regardless of output, physical facilities depreciate; minimum maintenance is required; certain taxes must be paid; property insurance is mandatory to avoid the danger of overwhelming loss. In addition, a nucleus of personnel must be kept indefinitely to take care of the retained assets, maintain records, and prepare for future changes. Costs experienced for these reasons are a function of time; they are the typical fixed expenses of a business. Their relative inflexibility reflects the fact that they are incurred in anticipation of an expected volume of future business.

Once operations take place, a company sustains additional expenses. These arise from the necessity of paying the labor directly employed in production, buying raw materials, and meeting expenditures incurred in distributing the end-items. These costs are variable. They fluctuate with the business actually done and must be subtracted from sales to determine the remainder available for fixed expenses.

A third category of costs falls between these two extremes. This group is called semi-variable because a portion is fixed while the remainder varies directly with sales. Identifying the separate elements of semi-variable costs may prove particularly difficult.

Companies go to great lengths to classify their costs properly. The distinction is sometimes made by examining carefully the company's chart of accounts and selecting those items that appear fixed or variable on the basis of the company's operations and policies. Often the historical relationships between costs and volume, established by means of extensive statistical studies, is the basis of the classification. Where these data are not available, such as in the evaluation of a new product or plant, industrial engineering studies may be employed. The efforts expended in obtaining an accurate cost grouping reflect the importance management attaches to this type of analysis.

## THE SIGNIFICANCE OF THE MARGINAL INCOME APPROACH TO THE SECURITY ANALYST

Developments of the past decade underscore the importance of costs to the modern business firm. An outgrowth of the major expansion programs undertaken by many corporations is the creation of huge financing requirements and overhead expenses; strong labor unions provoke recurring demands for new benefits; the need to develop and retain management staffs of outstanding quality requires special compensation devices; the undiminished demands of federal and local governments to keep taxes high; inflated prices augment the weight of maintenance and replacement expenditures. These developments have enlarged



the base of fixed costs required to support an enterprise and have correspondingly lifted the volume of sales needed by many companies to cover their fixed costs. For these reasons, break-even point determinations have become an important analytic tool in the planning kit of modern management.<sup>1</sup>

Despite the prolonged period of prosperity that this country has experienced, there are probably few analysts who are sufficiently optimistic to believe that the danger of a serious economic relapse has been permanently eliminated. Under these circumstances, it is important to gauge the effect that a business reaction might exert on a firm's operations. For example, assume two companies with similar capitalizations report the same amount of profits but have a different cost distribution, as follows:

	Company A	Company B
Sales	\$100,000,000	\$100,000,000
Variable costs	80,000,000	50,000,000
Marginal income	20,000,000	50,000,000
Fixed expenses	10,000,000	40,000,000
Net income	10,000,000	10,000,000

The sales of Company "A" can decline to \$50,000,000 and the firm would still meet its fixed expenses, whereas the break-even sales level of Company "B" is \$80,000,000. This calculation is particularly significant before a company has the opportunity to realize the sales gains flowing from an expansion program. If an economic recession occurs shortly after the program is completed, the increased fixed costs of operation that the company must sustain may cause a relatively small decline in sales to convert profits to losses.

Not only does a proper classification of costs enable a better analysis of the effect of a sales decline on profits, but it permits more accurate forecasting. By establishing a more realistic relationship between costs and volume, sales projections may be converted into sounder estimates of profits.

Analysts are accustomed to use the marginal income analysis in applying the margin of safety test to fixed-income securities. The margin of safety represents the percentage of gross revenues left after paying fixed charges. Theoretically, sales could decline by this amount before the earnings available for fixed charges would be eliminated. This method makes no allowance for the corresponding reduction in expenses that would occur as sales drop. To offset this shortcoming, analysts have sometimes estimated the percentage that expenses will decline for a given drop in gross revenues.<sup>2</sup> This is a step in the right direction, but it relies upon rule-of-thumb procedures rather than actual knowledge of cost patterns.

1. The break-even point in a company's operations occurs when sales produce a margin of income above variable costs that is exactly equal to the amount of fixed expenses. The following formula is commonly used to calculate this level:

$$\text{Break-even point} = \frac{\text{Fixed expenses} \div \text{Marginal Income}}{\text{Sales}}$$

2. Benjamin Graham and David L. Dodd, "Security Analysis," McGraw-Hill Book Company, 1951, p. 340.

An important legal distinction exists between bond interest and the minimum fixed expenses incurred by a company to keep its plant in good operating condition. The former charge is a contractual responsibility which must be met to avoid the danger of bankruptcy proceedings. While the latter expenses may be legally omitted, their continued curtailment would eventually lead to the dissipation of a company's earnings power. The conventional fixed-charge coverage test is useful to gauge the capacity of a company to pay bond interest and related charges; there is, however, no ready means of determining the margin by which a company is able to meet all its fixed expenses. If corporations released data distinguishing between fixed and variable costs, extensive studies of break-even levels could be met, leading to the establishment of tests of strength for this important concept. Analysts would then be able to classify companies on the basis of their ability to cover fixed expenses, including contractual and minimum operating requirements, and to revise these classifications as the cost changed.

#### ADAPTING THE INCOME STATEMENT TO THE MARGINAL INCOME APPROACH

Many companies prepare monthly income statements for internal use. These statements ordinarily contain a detailed listing of expenses. The information is intended for the use of top executives who scrutinize the data carefully to obtain an over-all perspective of company operations.

Starting about 1936, accountants began to experiment with a new method of reporting the internal profit and loss statement that takes into account the requirements of marginal income analysis. This approach differentiates between fixed and variable costs; it is called "direct costing" because only direct materials, direct labor, and direct variable overhead are taken into account for inventory evaluation, while the remaining expenses are charged to profit and loss as a period cost. Monthly financial statements fashioned along these lines re-establish the relationship between profits and sales, and adhere more closely to the marginal income concept found in break-even point analysis and flexible budgets. The benefits implicit in direct costing have attracted a wide following and the ranks of the converts to this method are constantly swelling.

It must be emphasized that while direct costing procedures are considered proper in handling internal problems of analysis, the method is not regarded favorably for purposes of inventory valuations in financial statements issued to the public. The prevailing opinion among professional accountants is summarized by the American Institute of Accountants in one of its research bulletins, which states:

"As applied to inventories, cost means in principle the sum of the applicable expenditures and charges directly or indirectly incurred in bringing an article to its existing condition and location.

"... the exclusion of all overhead from inventory costs does not constitute an accepted accounting procedure."<sup>2a</sup>

2a. Accounting Research Bulletin No. 43, *Restatement and Revision of Accounting Research Bulletins*, American Institute of Accountants, 1953, pp. 28-29.



Though the Securities and Exchange Commission has issued no specific rules or regulations pertaining to this problem, its reporting requirements call for compliance with generally accepted accounting principles, and the Commission looks upon the statement issued by the American Institute of Accountants as a sound basis for determining costs applied to inventories.<sup>3</sup> In addition, the Internal Revenue Service has issued stop-gap regulations that make provision for including the cost of raw materials, direct labor expenditures, and the indirect expenses required for production as elements entering into inventory evaluations; the general position of the Service, accordingly, is adverse to the valuation of inventories by direct costing procedures.<sup>4</sup>

Over a period of years, profits reported under either method will be approximately the same. For any given interval of time, however, severe variations may occur, particularly when production fluctuates sharply. Despite these problems in the use of direct costing income statements, some companies issue financial statements that do not reflect the allocation of overhead. Adams-Millis, for example, employs this technique, disclosing in a footnote the method adopted and its effect upon profits.

#### SUMMARY AND CONCLUSIONS

In its planning programs, management is making increasing use of the marginal income approach. These techniques stress differential rather than full-product costs. Their analytic methods include the flexible budget, which relates projected expenditures to varying sales volume; the direct-costing income statement, which eliminates fixed manufacturing expenses from inventories; and break-even point determinations. The basis of these studies is the classification of costs into their fixed and variable elements.

This type of information would be of great value to security analysts in gauging the vulnerability of corporate income to a business decline, measuring efficiency, and forecasting profits. Despite its importance, companies rarely publish such material. Various reasons may be suggested for this deficiency in reporting: Management may be re-

luctant to release data differentiating between fixed and variable costs on the grounds that it would give competitors a pricing advantage; the negative attitude of the regulatory agencies towards direct-costing income statements has probably caused some companies to decide against reporting in this form; in many cases, management does not release these data because it has not received enough requests from outside sources to justify this action.

These reasons do not seem particularly valid. First, cost statistics applicable to the entire operations of a company do not portray data that are vital in establishing prices for individual products; moreover, market conditions are often more important in pricing decisions than internal costs. Secondly, while it is undoubtedly true that a company would experience difficulty in attempting to recast a conventional income statement into the direct-costing form, this change-over is neither necessary nor even desirable. Most companies already have available detailed cost breakdowns and marginal income studies. No objection could be made against summarizing some of this information in statistical tables, graphic form, or in the narrative messages appearing in annual reports.

The third reason is probably more significant. Companies hardly can be expected to go out of their way to report important analytic data concerning their internal operations unless they feel there is a strong interest in this material. On the other hand, companies have revealed a willingness to include in their annual reports analyses of their internal operations, such as source and application of fund statements when there is sufficient stockholder demand for this material.

Under these circumstances there is a likelihood that a major impediment hindering corporations from reporting data that distinguishes between variable and fixed costs is the failure of a sufficient number of investors to request this information. As has been indicated, statistics of this sort would be of great value in the appraisal of securities. Analysts comprise the most important professional group representing investor interests. A logical point of departure in obtaining release of the information, therefore, is for the security analysts to take the initiative in explaining to corporate executives the desirability of publishing the data in the annual reports of their companies.

\* \* \*

"The foundation for a study lies in recognition of a few simple truths. The first is that the source of real investment income is the earning of a profit by the corporation in which the investment is held. A second is that there is no medium for passing losses on to the stockholder comparable to the dividend by which profits are passed on. A third is that a classification, to be really useful, must be based on essential characteristics and not on mere names."—*George Oliver May.*



*Why all the activity in New England Electric?*

**EXTRACTING SEVEN  
POWER DIVIDENDS  
FROM A  
HIGH YIELD  
RIVER**

Seven well-placed power stations squeeze practically every last kilowatt of electric power from the waters of New England's picturesque Deerfield River. Yankee frugality? Perhaps, but Yankee ingenuity, too, and ingenuity is the watchword in this thriving region where New England Electric is investing millions of dollars each year to keep ahead of power demands of new and long established industries—reflecting the true prosperity of the *new* New England.

*All this means good living and profit to New Englanders—and profit, too, for the farsighted folks in other sections of the country who have investments in New England business and industry.*



**NEW ENGLAND ELECTRIC SYSTEM**





# Yield on Common Stock Investments

WILFORD J. EITEMAN

THE WORD "YIELD" as applied to common stocks by security analysts refers to the mathematical relationship of dividends to market price. If a company pays an annual dividend of \$3.00 and if its stock is quoted at \$60.00, its yield is considered to be 5 per cent, i. e.,  $(\$3.00 \div \$60.00)$ . A question immediately arises as to which market quotation is used in yield computations.

For example, the common stock of Otis Elevator Company varied in 1955 from a low of \$45 in January to a high of \$70 in November. Since the company paid a dividend of \$3.12½ in that year, its yield could be anything from 6.94 to 3.46 per cent, depending on which 1955 quotation happened to be used in the computation. The problem is normally solved by using some type of average quotation. In the case of Otis Elevator, this would mean a yield of 5.5 per cent for the year 1955.

"Averages" are abstractions which necessarily relate to past periods of time. Purchasers and sellers of securities execute transactions at specific prices: not at average prices of past periods. Furthermore, an average price is not indicative of the price at which an investor can buy or sell, nor is it suggestive of the price level most likely to exist in the future. Computations in which averages are a factor must be interpreted with a great degree of caution. For example, consider the position of a potential buyer (or seller) of Minneapolis-Moline common stock on, say, January 3, 1954. The ratio of the most recent annual dividend payment to the average 1953 quotation was 9.1 per cent. Of what possible value was this information? Did it mean that the investor could expect such a yield in 1954? No, because the company which paid a dividend of \$1.20 in 1953 skipped dividends altogether in 1954 and in 1955. Did the high 1953 yield indicate that the stock was overvalued and should be sold? No, for the offering price in January 1954 turned out to be the lowest price of the subsequent two years. Hence, an investor would have been best advised to hold his shares until November 1955, at which time the price was two and a half times higher.

The danger of current yield data lies in a tendency of uninformed investors to accept current yields as indicating the rate of return which they may expect if they hold their shares or if they purchase additional shares at current prices.

Temporary fluctuations in current quotations do not have the significance to long-term holders of common stocks that they have to speculators and to in-and-out traders. For long-term holders the cost of acquiring shares is a factor that remains fixed and it is against this fixed factor that the profitability of this type of investment is normally measured. Ratios comparing annual cash return to cost of acquisition, therefore, are the computations of greatest importance to long-pull investors.

Consider the information needs of a lay investor who is trying to determine the wisdom of investing a lump sum (such as \$10,000) in common stocks. His alternatives are

to deposit the funds in a savings bank at a set rate of interest or to use them to acquire bonds that will provide him with an unvarying yield to maturity. If funds invested in common stocks could be relied upon to earn a rate of return equal to "current yield" on common stocks, the problem would be easily solved. However, there is no positive assurance that dividends of future years will equal dividends currently being paid, although this is implied when current yields are quoted. Evidence exists, however, to support an expectation that yields on cost have a tendency to increase with the passage of time. As the figures of Table 1 suggest, the average annual dollar-and-cent dividend of corporations has increased steadily in the past. The data in this table indicate only the direction of the trend and are not in any sense a prediction as to the extent of the increase. But they suggest that an investor may reasonably expect a higher and higher yield on a lump sum investment in a diversified list of common stocks.

Table 1  
Average Annual Cash Dividend Paid by  
Two Hundred Listed Companies  
Chosen at Random  
1946-1955

Year	Average Dividend
1946	\$1.02
1947	1.27
1948	1.44
1949	1.48
1950	1.78
1951	1.72
1952	1.65
1953	1.62
1954	1.67
1955	1.88

Most published data relate dividends to current market values and investors frequently assume that such yields indicate the yields which they are making on their commitments. Current yields at year end on Lily Tulip Cup Corporation common stock are indicated by the heavy line on Figure 1. But the yields to an investor who purchased his stock on January 2, 1948, follow the dotted line shown on this chart. It is true, of course, that one who purchased a stock at \$40 that is currently quoted at \$80 and paying a dividend of \$4, is earning 5 per cent on the market value of his holding. This might be an important fact to a speculator who frequently sells one issue to acquire another. But the long-pull investor who buys to hold is too busy with day-to-day activities to concern himself with short-time variations in the attractiveness of various issues. The only facts of importance to such an investor are that once upon a time he invested \$40 in a stock that is paying a current cash dividend equal to 10 per cent of the amount he invested.

The virtues of thrift and regular periodic saving have been a popular text since the days of Benjamin Franklin.



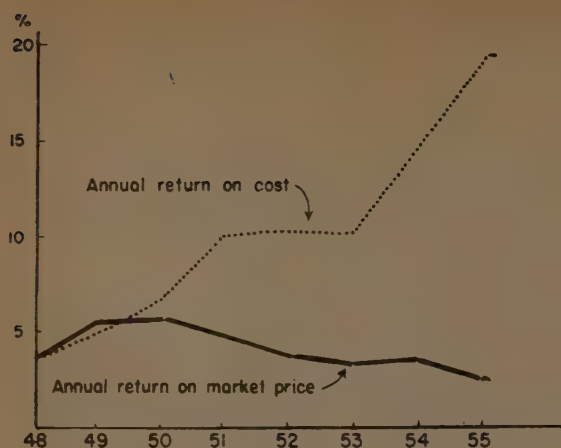


Figure 1

Comparison of Annual Return on Cost of a 1948 Purchase of Lily Tulip Cup Corporation with Annual Market Yields. (1948-1955)

In recent decades the idea has been extended to common stock investments and large and small investors have been advised by brokers, investment counselors, and the stock exchanges to make regular periodic purchases of common stocks for long-pull holding.

Current yield means nothing to such investors. What they should watch is the relationship of current cash income to cost of acquisition. Their problem is complicated by the fact that they have many "costs of acquisition" (see Figure 2) and that their average cost is changed each year by additional acquisitions. Their problem is simplified statistically by comparing aggregate income in each year with aggregate cost of acquisition to date. This is the only ratio that will reveal the profitability of the investment plan. To be able to say that an investor is currently earning this or that per cent on the funds invested means something: to say that he would be earning "x" per cent if his funds had been invested at current prices means nothing. Furthermore, because investors are conscious of the trend in cash dividend payments (exhibited in Table 1), they normally expect annual yield on cost to increase slowly with the passage of time.

#### YIELD FROM REINVESTMENT OF INCOME

The figures in Table 1 reveal the historical basis for expectations that yield on the cost of each commitment will increase with the passage of time. The discussion of the paragraph above explained the wisdom of a policy of periodically increasing one's holdings of common stocks. For decades the Government (in its war bond drives) and saying institutions (in their advertising) have been extolling the profitability of compounding returns by reinvesting current income. It was inevitable, therefore, that sooner or later all three ideas (investing in common stocks, periodic acquisitions, and reinvestment of current income) would be combined into a single investment plan. Certainly, if it is profitable to compound one's return by reinvesting interest earned at a fixed rate, it must be even

more profitable to compound one's return by reinvesting current income at a gradually increasing rate.

The over-all profitability of such a plan is measured by comparing the market value of accumulated holdings as of a given moment with the sum of periodic commitments made to date.<sup>1</sup> Thus, if an investor devoted \$1,000 a year to a program of common stock purchases and reinvested his dividend income, and if at the end of ten years he held "x" number of shares, with market value of \$13,971.64, his average rate of return is 6 per cent. (The accumulation of an annuity of \$1,000 for a period of ten years at 6 per cent.) There is no other method of making the computation acceptable to mathematicians. Furthermore, the over-all rate of return is 6 per cent regardless of whether the increase in the value of holdings is due to the reinvestment of annual dividends or to a rise in the market values of shares.

Unfortunately, persons engaged in this type of investment find it difficult to compute their yield after income tax as perhaps they should. This difficulty arises from the fact that the applicable income tax rate varies with the aggregate amount of annual taxable income. However, individuals who regularly purchase additional shares or issues and who reinvest their dividends are, in most instances, saving for a retirement that is to begin later. They do not use a portion of their dividend receipts to pay their tax, but pay the income tax attributable to their investment income with funds taken from other earned income. As a matter of fact, such persons are not even interested in knowing their real or net rate of return on investments. What they wish to know is the rate at which their retirement estate is increasing. And this is the information revealed by computing "yield" on average cost before rather than after taxes.

1. The late Lord Keynes once said that an investment should be regarded in terms of its probable yield, including principal appreciation, over the whole life of the commitment.

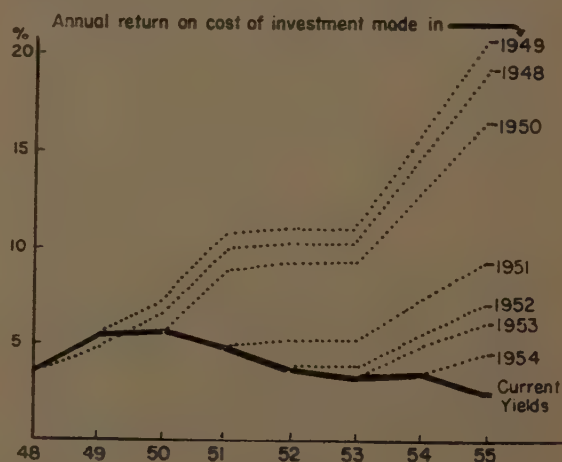


Figure 2

Comparison of Annual Return on Cost of Purchases of Lily Tulip Cup Corporation at various dates with Annual Market Yields, 1948-1955.



# CREDIT

## Keystone of Our Expanding Economy

Our dynamic use of Credit makes it the very keystone of America's remarkable corporate and individual progress. And Credit is more than an integral part of our great American economy; it is proof positive of America's faith in itself and its future. Associates is proud to share in this faith.

From a small beginning 38 years ago, Associates has forged ahead to where today it is one of America's most important sources of Credit—having provided over \$1½ BILLION last year to the automotive industry alone, for retail installment purchases and dealer wholesale financing. In addition, Associates annually provides hundreds of millions of dollars to American industry, and to individuals for family needs. With assets of over 900 million dollars, Associates continues to look ahead, proud of its important part in supplying America's credit so vital to our expanding economy.

ASSOCIATES LOANED  
AMERICAN INDUSTRY  
OVER \$124 MILLION

ASSOCIATES PROVIDED  
OVER \$1½ BILLION FOR  
AUTOMOBILE PURCHASES

ASSOCIATES PROVIDED  
OVER \$94 MILLION  
FOR FAMILY NEEDS

## ASSOCIATES 1956 FINANCIAL REPORT

### CONDENSED CONSOLIDATED BALANCE SHEETS

#### ASSETS

	Dec. 31, 1956	Dec. 31, 1955
CASH AND MARKETABLE SECURITIES.	\$ 90,150,167	\$ 85,724,980
RECEIVABLES:		
Retail motor vehicle installment receivables	\$700,367,608	\$649,982,667
Wholesale motor vehicle short-term loans	72,102,682	81,398,810
Direct and personal installment loans	62,836,287	48,481,888
Commercial and other receivables	40,278,730	35,362,536
	\$875,585,307	\$815,225,901
Less: Unearned discounts	54,429,155	49,347,481
Reserve for losses	22,314,277	18,833,110
Total receivables, net	\$798,841,875	\$747,045,310
OTHER ASSETS	16,038,965	12,444,059
	<u>\$905,031,007</u>	<u>\$845,214,349</u>

#### LIABILITIES

	Dec. 31, 1956	Dec. 31, 1955
NOTES PAYABLE, short-term	\$436,556,800	\$424,290,800
TERM NOTES due within one year	28,021,000	34,720,000
COMMON STOCK DIVIDEND payable January 2, 1957	2,031,557	1,875,283
ACCOUNTS PAYABLE, ACCRUALS AND RESERVES	37,481,065	38,161,383
UNEARNED INSURANCE PREMIUMS	29,227,061	30,156,749
LONG-TERM NOTES	182,300,000	142,565,000
SUBORDINATED LONG-TERM NOTES	65,600,000	60,500,000
PREFERRED STOCK	22,500,000	22,500,000
COMMON STOCK	31,254,720	31,254,720
SURPLUS	70,058,804	59,190,414
	<u>\$905,031,007</u>	<u>\$845,214,349</u>

### CONDENSED CONSOLIDATED INCOME STATEMENTS

	Year Ended	
	Dec. 31, 1956	Dec. 31, 1955
Discount, interest, premiums and other income	\$122,457,993	\$109,907,061
Operating expenses	<u>86,919,697</u>	<u>73,552,926</u>
Net income before Federal income tax	\$ 35,538,296	\$ 36,354,135
Provision for Federal income tax	16,030,000	17,350,000
Net income	<u>\$ 19,508,296</u>	<u>\$ 19,004,135</u>

Consolidated net earnings per share of common stock after payment of preferred dividends	\$5.93	\$5.86
--	--------	--------



ASSOCIATES INVESTMENT COMPANY  
ASSOCIATES DISCOUNT CORPORATION  
and Other Subsidiaries  
HOME OFFICE • SOUTH BEND, INDIANA



# PUTTING THE ATOM TO WORK: A Progress Report from General Electric



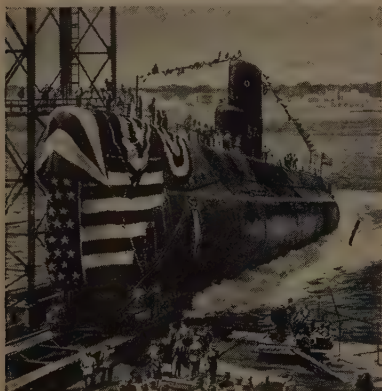
**Prior to 1940** Scientists at the General Electric Research Laboratory were discovering facts about the structure of the atom that contributed to the separation of U-235 from natural uranium in 1940.



**1942-45** General Electric developed and produced complex power-supply apparatus and control and instrumentation for the vast *Manhattan District* project that made the first atom bombs for the U.S.



**1946** Since the end of World War II, General Electric has been operating, for the government, the giant Hanford Atomic Works in Washington State, producing plutonium for the nation's defense efforts.



**1950** A contract was awarded to General Electric to develop an atomic power plant at the Knolls Laboratory for the U.S. Navy submarine *Seawolf*. The *Seawolf* was launched in 1955 for final outfitting.



**1951** Work on the development of a nuclear propulsion system for aircraft was begun by General Electric at Evandale, O., and is continuing both at this location and, more recently, at Idaho Falls, Idaho.



**1955** After Congress opened atomic development to private industry, General Electric established a department that is designing, developing, manufacturing and marketing atomic reactors and equipment.



**1956** In addition to domestic orders, General Electric — through the International General Electric Co. — announced sales of an atomic research reactor for Spain and a power reactor for Latin America.



**1956** Construction began on the multi-million-dollar General Electric Vallecitos Atomic Laboratory in California. It is dedicated to developing civilian uses of atomic energy, and will be completed in 1957.



**1957** A G-E experimental reactor will help bring about 5,000 kw. of atomic power to the San Francisco area. Steam from the reactor will be furnished Pacific Gas & Electric, which will generate the power.



# What General Electric is doing to help bring America atomic-electric power



**1947** General Electric, under contract to the A.E.C., has operated the Knolls Atomic Power Laboratory in Schenectady, N. Y., since 1947, where research into applications of atomic energy is being conducted.



**1955** America's first commercially distributed atomic electricity came from the prototype reactor G. E. built for the *Seawolf*. The contract for Canada's first atomic station was awarded to Canadian G. E.



**1960** The Chicago area is scheduled to get 180,000 kw. of atomic electricity from the world's largest all-nuclear power plant, being built by G. E. for Commonwealth Edison and the Nuclear Power Group, Inc.

**New atomic laboratory will open next year; world's largest all-nuclear power plant to operate in 1960**

Two years ago, Congress opened the development of the atom to private industry. In that short time, America's businesses, working with the government, have made significant progress toward practical atomic electricity while continuing needed defense work for our country.

At General Electric, major contributions to the defense effort are, of course, a vital part of the company's atomic operation. This work requires an unusually high number of our scientists and engineers—about 2,250 of them plus thousands of other skilled people. But since the Atomic Energy Act of 1954, we also have made major investments in both manpower and facilities to put the atom to work in electric-power production and other civilian uses.

Currently, one of the company's major projects is the design and construction of the world's largest all-nuclear power plant—Commonwealth Edison's Dresden Station near Chicago. This 180,000-kw. plant is scheduled for regular operation by the end of 1960.

## Providing the "tools"

To help solve the technological problems, General Electric is taking a long-term risk by investing in a new multimillion-dollar atomic laboratory near Pleasanton, Cal. At this laboratory, an experimental boiling-water reactor will be in use in developing atomic reactors for power plants such as the big Chicago station.

Next year, this experimental reactor will help bring about 5,000

kw. of atomic electricity to the San Francisco area. Steam from the reactor will be furnished the Pacific Gas & Electric Company, which will then generate the power.

Another major investment in atomic facilities is being made in San Jose, 20 miles from the new laboratory. Here will be the headquarters of General Electric's civilian atomic business—plant and equipment for engineering, manufacturing and marketing power, research and test reactors, fuel elements, control systems and other components.

## Pioneer fields demand risk taking

These and other commitments are being made with the realization that atomic energy is a pioneer field calling for ingenuity, boldness and financial risk taking with little prospect of a profitable return for many years to come. Today, the buyer of atomic equipment knows he is not buying the ultimate in atomic power development. And the seller, or manufacturer, pioneers by risking substantial amounts of money to do now what has to be done to open a new industry with future business opportunities for many companies, large and small.

As we see it, progress toward practical atomic electricity will continue only as private businesses are encouraged to continue such risk taking. The support of an informed public—and its representatives in government—is needed now more than ever before, so that America will have a competitive atomic industry that can furnish plentiful, economical power to all.

*Progress Is Our Most Important Product*

**GENERAL  ELECTRIC**





### Agricultural Chemicals

To satisfy Agriculture's big-tonnage appetite for nitrogen plant food, CSC supplies Hi-D Ammonium Nitrate, new-granule fertilizer, made by a patented CSC process. In addition, CSC produces nitrogen solutions, aqua and anhydrous ammonia. Through fertilizer manufacturers, these products go to help make every acre more productive. Products made for pesticide formulas include Dilan®, ethyl formate and metaldehyde.



### Industrial Chemicals

Leading the product list is a new family of chemicals, the Nitroparaffins — nitromethane, nitroethane, 1-nitropropane, 2-nitropropane, and derivatives. A CSC development, the "NP's" open up dynamic, new areas of chemical opportunity — and are already being used in a wide range of industries. Other basic products include ammonia, methanol, ethyl alcohol, butanol, methylamines, formaldehyde and pentaerythritol.



### Automotive Specialties

CSC's automotive line includes both private label and branded products such as PEAK® ethylene glycol antifreeze and Nor'way® methanol antifreeze, Nor'way cooling system chemicals and automotive specialties. In addition, last year CSC introduced Peak Nitro Fuel, a new special fuel for racing cars. For home use, CSC markets Quixol® and Quakersol®, proprietary brands of denatured alcohol.



### Potable Spirits

CSC's oldest line of products is the Rossville® brand of alcohols, which trace their ancestry back to a Rossville, Indiana, distillery started in 1847. Today, CSC potable spirits are produced exclusively on order and are sold in bulk only. Products include fine cane and grain neutral spirits as well as custom production of whiskies of unexcelled quality.

Sales Offices  
in  
Principal Cities



### Animal Nutrition Products

CSC supplies the feed industry with antibiotic and vitamin feed supplements that help produce better broilers, laying hens, turkeys and hogs. Chief among these animal nutrition products are Bacifer® bacitracin antibiotic supplements, B.Y-16® and B.Y-21® riboflavin supplements, multivitamin supplements, choline chloride and butyl fermentation solubles.



### Pharmaceutical Chemicals

Newest antibiotic produced by CSC is cycloserine — used in the treatment of tuberculosis. CSC is also a leading manufacturer of bacitracin and was the first company to produce this antibiotic. Crystalline riboflavin (vitamin B<sub>2</sub>) is another item important to the drug field. Other products include anti-enzymes. All CSC drugs are supplied to pharmaceutical companies who market them under their own label.

Plants at  
Sterlington and Harvey, La.  
Terre Haute, Ind.  
Peoria, Ill. • Agnew, Calif.  
Newark, N. J.

**COMMERCIAL SOLVENTS CORPORATION**

General Offices: 260 Madison Ave., New York 16, N. Y.



# The Importance of Basic Economic Forces

EDMUND W. TABELL

THE MAJOR QUESTION concerning investment policy today is not whether business will rise or fall a bit in the next few months or how soon automobiles and housing are likely to recover from the present slump, or whether the Dow industrial average may sell at 520 or 420 in the next six months. The significant item to evaluate is whether the long-range basic forces that brought about the enormous increase in economic activity since 1946 have subsided or are likely to continue. Will these forces exert powerful pressure on the economy over the years ahead?

It may be helpful to examine some of the most influential fundamental forces to distinguish any significant change in their potency. These fundamental forces can be roughly grouped into eight major groups.

*The Rise in Wages:* Wages have been lifted annually for the past fifteen years. At the time of each of these mark-ups one might have concluded that conditions could be different in the following years, that the last loop had been seen in the wage-price spiral. Available evidence at hand suggests this is not true. The real significance of the recent steel wage agreement is that it calls for pay increases not only this year but next year and the year after, regardless of the condition of the economy at the time. The unions' monopoly of the labor supply and their tremendous strength now make an annual wage increase virtually a nation-wide economic practice. The result is that costs creep up along with prices and the purchasing power of the dollar declines.

*Changes in Income:* The movement upward in income groups has been rapid in the last five years. During this period, when prices have been relatively stable, literally mass millions have climbed upward in income groups and in discretionary spending power. It is estimated that in 1956 the number of families with incomes of over \$4,000, after taxes, will reach 25.8 million, or more than double the 12.2 million in that group even as late as 1950.

At the production level possible in 1960, the number of families with over \$4,000 of disposable income could climb to 36 million, or triple the 1950 number.

As these families move up from one income class to the next, they could represent substantially increased markets for goods, services and investments if they take on the habits and desires of the income group in which they move. This is true even though taxes and cost of living have increased.

## DISCRETIONARY SPENDING POWER

Prewar, our economy was typified by the \$25 a week family. Average weekly earnings for production workers in manufacturing, in 1940, were \$25.20. The "middle income" family, for example, fell in the \$1,000 to \$1,500 income group. Now the "middle income" family is in the \$4,000 to \$5,000 income group. Weekly earnings in manufacturing, by December 1955, had grown to \$79.71,

or over three times the 1940 level. The most recent figure is over \$82.00. After taking into account both increased taxes and present costs of maintaining an equivalent 1940 standard of living in the necessities of food, clothing, and shelter, the middle-income family now has discretionary spending power over five times as great as the prewar middle-income family.

This represents a huge pool of purchasing power dependent upon the whim or discretion of the individuals as to how it is to be used. People now have the money to select and choose between an infinite variety of items beyond bare necessities. Many will add new products or services or will increase their basic expenditures for better clothing or housing. Many will increase savings or investments. You hear it asked: Who buys all the new homes, all the new cars, all the television sets, the outboard motors, the airlines tickets, the vacations abroad? The answer is the families crowding into the middle income group, flocking to the suburbs and expanding their living.

## REAL PURCHASING POWER

The total real purchasing power of the United States population, in the first half of 1956, is at a level 92% greater than in 1940. This increase in real purchasing power has even greater significance when it is analyzed by income groups because it indicates that mass millions of middle income Americans have moved up the scale in real purchasing power to the point where they can make substantial improvements in their living standards and in savings and investments. Percentagewise, for example, the increase since 1940 in real purchasing power varied by income groups as follows:

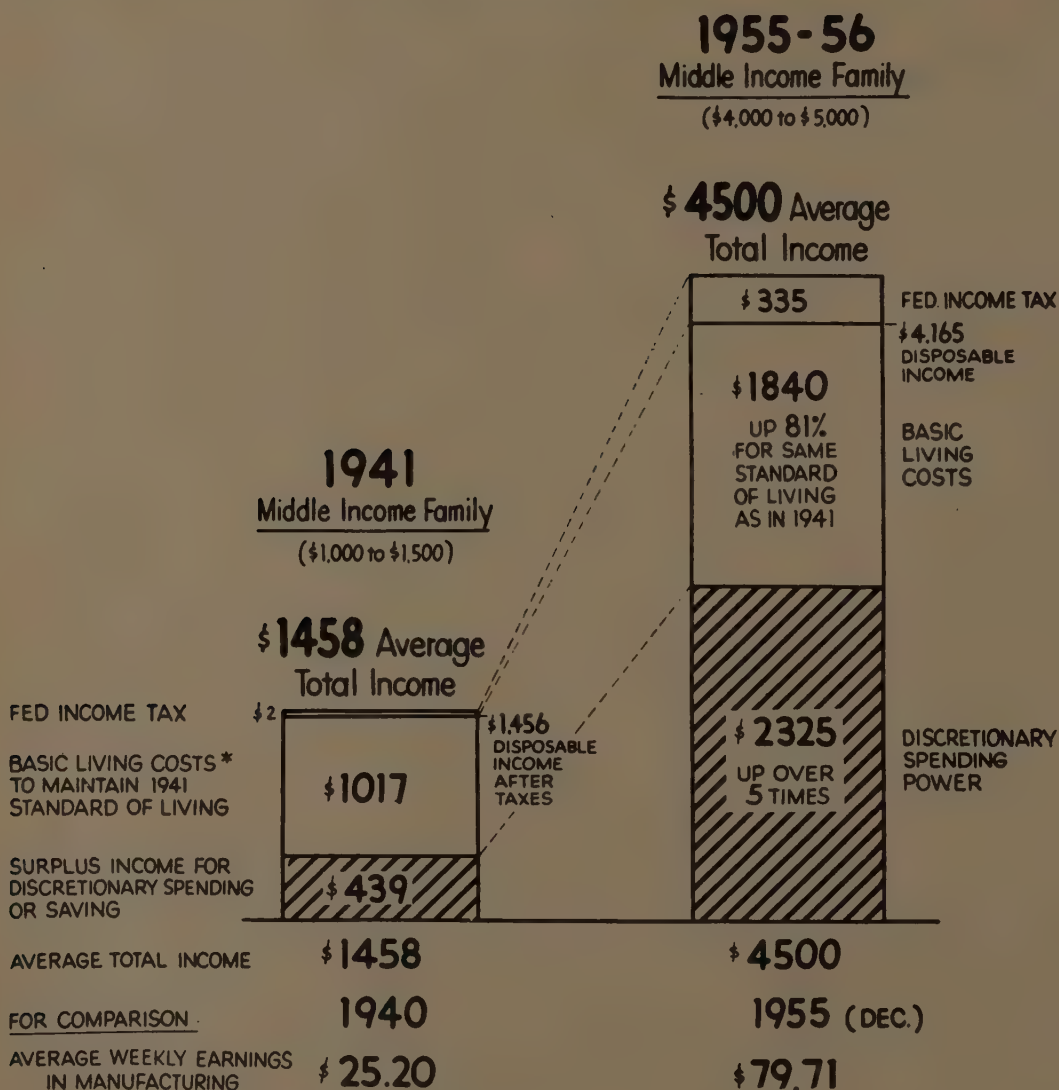
Highest	Fifth, up	69%
Second	Fifth, up	90%
Middle	Fifth, up	117%
Fourth	Fifth, up	143%
Lowest	Fifth, up	159%

*Population Growth:* Along with a rapidly rising standard of living we have the added stimulus of a bulge in population growth and a likelihood of large increment in family formations five to ten years hence. 1945 projections of our postwar population growth were not even close to the mark. In its forecast of the population 1945-1975, published nine years ago, the Bureau of Census anticipated that the United States population would be 160 million in 1965. Today, nine years earlier, it is 168 million. Present trends indicate that in 1965 the population will be over 190 million rather than 160 million. Population continues to grow at the rate of 2.8 million per year and the estimated total of 4.2 million births in 1956 will mark the highest point in our history.

The birth rate has continued at a level far above earlier predictions by population experts. Births in the first six months of 1956 were the largest on record and were 3%



# HOW SHIFT UPWARD IN INCOME GROUP HAS INCREASED DISCRETIONARY SPENDING POWER OF TYPICAL MIDDLE INCOME FAMILIES

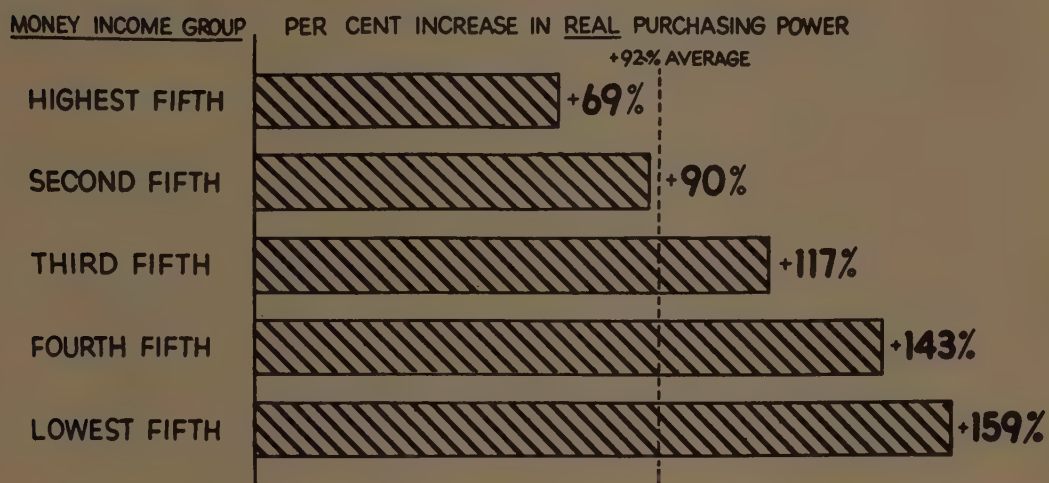


\*Food, Clothing, Housing and Household operation

Source of 1941 figures - U S Dept of Labor, Bulletin No 822

# INCREASE IN REAL PURCHASING POWER

BY FIVE ECONOMIC GROUPS - 1940 to 1956 (Est.)



CONSUMER SPENDING UNITS RANKED FROM HIGHEST TO LOWEST INCOME GROUPS OF 20%	DISPOSABLE INCOME AFTER TAXES - IN TERMS OF 1955 DOLLARS							
	SHARE OF TOTAL DISPOSABLE INCOME		DISPOSABLE INCOME TOTAL BILLION 1955 DOLLARS			AVERAGE PER CAPITA (1955 DOLLARS)		
	1940	1956 (EST)	1940	1956 (MINIMUM)	% INCREASE	1940	1956 (MINIMUM)	% INCREASE
HIGHEST FIFTH	47.7%	42.0%	\$69.7	\$117.6	69%	\$2,644	\$3,532	34%
SECOND FIFTH	23.2%	23.0%	33.9	64.4	90%	1,286	1,934	50%
THIRD FIFTH	15.9%	18.0%	23.3	50.4	117%	884	1,517	72%
FOURTH FIFTH	9.5%	12.0%	13.8	33.6	143%	524	1,009	93%
LOWEST FIFTH	3.7%	5.0%	5.4	14.0	159%	205	420	105%
	100%	100%	\$146.1	\$280.0	92%	\$1,106	\$1,680	52%

Per capita disposable income may be \$1,680 in 1956 (minimum) vs. \$1,106 in 1940 (in terms of 1955 dollars) or an increase of 52% in real per capita purchasing power.

Share of total by 5ths estimated from Economic Report of the President, January 1949, Pgs. 14-15 for 1940, and from Federal Reserve Bulletin June 1955 for 1956. 39 million consumer spending units in 1940 and 56 million in 1956.



above 1955. On the basis of present projections, the requirements for schools, hospitals, water systems, highways, and other non-Federal projects associated with population growth are estimated at \$20 billion per year in the next decade, or more than double the present record-breaking rate of public works construction.

The dramatic changes in the age groups in the United States population are also a very constructive factor.

#### AGE GROUPS

Older people have continued to increase, but the most startling fact is that due to ten years of depression, a small number of family formations and a low birthrate, the number of children under 10 have decreased sharply in relative size. In 1940, for example, there were just as many people 35 to 39 as there were children under 5.

#### INCREASES SINCE 1940

There are 67% more children under 5 years of age in our population in 1955 than in 1950, and 61% more in the 5 to 9 age group. This huge increase in the number of children is bringing about inadequate school facilities and shortages of teachers as well as juvenile delinquency. It will affect housing requirements, food consumption, and many phases of family living. During the next five years, to 1961 and beyond, there will be a huge movement of children into the adolescent age groups where food consumption is high and where interest in many products starts.

Of equal importance is the fact that in order to support the huge increases of children under 10, all of whom are non-productive and also to support the 53% increase since 1940 in people 60 years of age and over, a large part of whom are non-productive, we must increase our productivity sharply over the next five to eight years in order to maintain our present standard of living. The new workers needed to increase this productivity will come from the 10 to 19-year-old age group. This age group has increased only 2% since 1940 as against sharp increases in children under 10 and in adults over 60. This is obviously going to result in a labor shortage. Industrial production must rise 50% by 1965, but available manpower will rise only 14%. Automation must fill this gap. This would not mean an entirely automation, push button type of economy, but it does mean that new and more efficient plants and new and more efficient methods of productivity are needed. This is the main reason why capital spending has increased so sharply over the past ten years.

Another population factor is the increasing size of the families. For many years American families decreased in size. Now there are indications that this trend is reversing. A major factor in holding up the birth rate has been the change in attitude of young couples toward having more than one or two children. The number of mothers bearing a second child is 105% greater than in 1940, the number of third born has been increased by 125%, and the number of fourth born by 110%.

This continued increase in the birth rate together with the high level of consumption and home building has occurred in spite of the negative factor of a long-time declin-

ing trend in the number of persons reaching adulthood—a result of declining births in the 1930's.

By 1965 the number reaching 18 years of age will be 65% over the 1951 level and the number reaching the family formation stage will increase rapidly after that. The great crop of war and post war babies will have reached maturity, will marry and set up their households. This presages another rush for houses, appliances, cribs, diapers and all the paraphernalia of modern living. Another population factor is the shift to the suburbs and the drop in farm population.

#### SHIFT TO THE SUBURBS

Between 1940 and 1956 population in the suburban portion of 162 metropolitan areas grew 63% while the central cities grew 25% and the rest of the United States grew only 11%. The shift to suburban areas has been dramatic in the past five years. From April 1, 1950 to the end of 1955 the civilian population of the United States grew by approximately 14 million persons. 98% of this growth was in the metropolitan areas, cities and suburbs, while only 2% was outside the large metropolitan areas. 83% of the total growth in population—or over 11½ million—took place in the suburban parts of the metropolitan areas. This rapid shift reflects changing living standards, changing shopping habits and the increasing trend toward family living. Pressure will continue for suburban shopping centers, super-market distribution and for multiple car ownership among suburban families:

Farm population, on the other hand, dropped from 30½ million or 23.1% in 1940; to 25 million or 16.6% in 1950; and on April 1, 1955 at 22.2 million had dropped further to approximately 13.4% of the total.

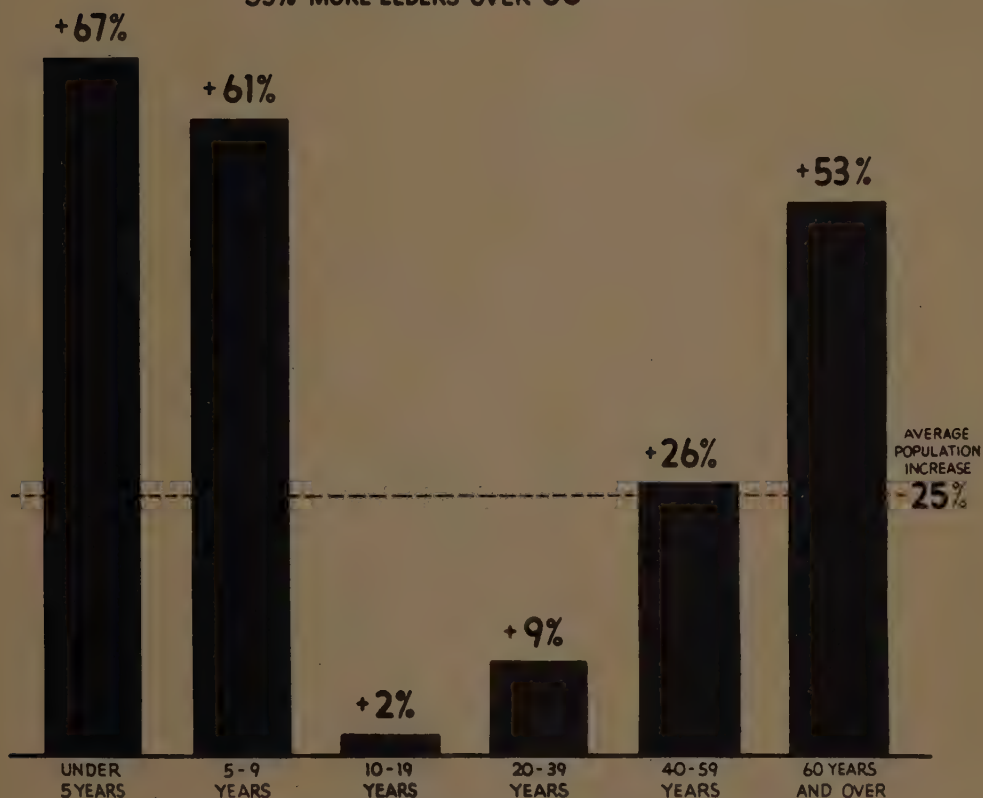
*Money and Credit:* The Government has assumed the responsibility for maintaining full employment. Its main weapons are the control of credit, taxes and spending. The last two factors were always in the control of the Government. The first, credit, shifted from the control of bankers to politicians in the early 1930's. No political party in power can survive a depression. Inevitably, by the very nature of politics, these weapons will be more often used as a stimulant than as a depressant, which gives an inflationary bias to most of the economic and monetary moves that the Government can make. Occasionally, as at the moment, when consumption demands aided by borrowing exceeds the supply of goods, the Federal Reserve Board will use its power of money control to take some of the inflationary steam out of the economy and thus stem the tide of rising living costs. Reducing the supply of credit available for borrowing by individuals and corporations is one of the board's major areas of attack. Tight money has not yet halted the growth in installment and mortgage debt but it has slowed down the rate of increase. The policy is also forcing the postponement of corporate expansion programs which were to have been financed by debt. These steps have helped slow down the perhaps too rapid rate of expansion.

But in its struggle to maintain a stable dollar, the board has no control over the most important ingredient of prices—wages. If labor unions continue to demand annual wage

# SIGNIFICANT CHANGE IN AGE GROUPS

1955 vs. 1940

67% MORE CHILDREN UNDER 5 }  
 61% MORE CHILDREN 5 TO 9 } 64% MORE CHILDREN UNDER 10  
 53% MORE ELDERS OVER 60



## DISTRIBUTION OF POPULATION (MILLIONS)

	UNDER 5	5-9	10-19	20-39	40-59	60 & OVER	TOTAL
1940 (APRIL 1)	11.4	10.7	24.1	42.5	30.1	13.7	132.5
1955 (JULY 1, EST)	19.0	17.2	24.5	46.3	38.0	21.0	166.0
INCREASE	7.6	6.5	0.4	3.8	7.9	7.3	33.5
% INCREASE	+67%	+61%	+2%	+9%	+26%	+53%	+25%



increases greater than the cost reductions which industry can bring about through technical and managerial progress, the long run movement of prices can only be upward and the value of the dollar downward. Maybe the increase in the price level can be held close to the advance in labor costs. This increase has been in the neighborhood of 2% per annum in recent years. While this picture may seem harmlessly low, a cumulative rise in the cost of living at an average rate of 2% per year would represent a substantial increase over an average investor's lifetime.

Many point with alarm to our mounting debt total but few seem to recognize the significance of the rapid decline in the ratio of total debt to total production.

#### RATIO DEBT TO G. N. P.

In 1930, the outstanding net total of public and private debt in the United States represented more than double a full year's national production, actually 210% of the year's total production. By 1955 total debt, although over three times greater in dollars, had dropped to 160% of a year's production. Production, measured in dollars, had grown more than fourfold.

Even more spectacular has been the drop in the relation of total private debt to production. Net private debt of individuals, business and corporations represented 176% of a year's production in 1930. By 1955 the relationship had dropped nearly in half, to 91% of a year's production.

#### CONSUMER CREDIT EXPAND 60%

An added source of purchasing power is the fact that consumer short term credit is low in relation to discretionary spending power. The present level of consumer credit at over \$35 billion worries some—it is about four times the \$8 billion level of 1940.

But consumer discretionary spending power, in 1957, is expected to be over six times the 1940 level.

The ratio of consumer credit to discretionary spending power has dropped from 31% in 1940 to about 22%. This means that consumer credit, installment sales, charge accounts, and personal loans, could expand by 60% over the high 1955 level without being over-extended in relation to discretionary income. Just to reach the 1940 ratio could add about \$20 billion to current purchasing power.

*Capital Expenditures:* The labor shortage, because of the smaller number of 10-19 year age group mentioned earlier, is one of the reasons for increased capital expenditures to offset higher wages by further mechanization and the adoption of automation. The pressure to lift efficiency requires a high level of capital outlays. The effect which this kind of spending exerts on the economy is out of all proportion to its size. The consequences extend far beyond the mere raising of demand for plant, machinery etc. Increased payrolls and higher profits of the capital goods companies create a larger demand for consumer goods. The latter in turn lifts profits and payrolls in consumer industries generating additional personal spending.

The plans of one company to install a new, labor saving, cost reducing machine force its competitors to search for still better machines. Back in 1948-1950 no one dreamed

that by 1955 capital spending would have doubled over the record totals of that period. Yet the long range trend has been upward almost year by year and prospects indicate annual rates will reach \$45-\$50 billion in the next few years as compared with \$36 billion today.

*Industrial Research:* The annual expenditures for research have doubled in the last five years, are three times as large as in 1946 and 20 times more than in 1940. We have spent more on organized research in the past six years than in all years prior to 1950. The cumulative results of these rising expenditures is the torrent of new products pouring out of the research labs. Some companies report that 25% to 50% of their current sales are in products developed within the past decade. The mounting volume of research is a long range force of major importance.

*International:* Much of what has been happening in the United States in recent years is now occurring in other parts of the "free world." Broader distribution of income in Western Europe is opening up American-style mass markets. The industrial progress abroad is even more rapid than at home.

The revival of world trade seems destined to continue. Now that war-torn Europe is on its feet, the United States and its allies have turned their efforts to building up the far-flung backward areas. For the first time in 30 years economic conditions outside the United States are acting to stimulate rather than depress the domestic economy. The boom overseas is boosting our own efforts to an all-time high, bringing about world competition and higher prices for raw materials. Many United States corporations are doing business in other parts of the world, and a goodly percentage of earnings come from abroad. Enlightened world leaders believe that this flow of capital and interchange of goods must be increased.

*Institutional Investor:* A long-range investment factor which is increasing in strength year by year is the growing institutionalization of savings. The sharp increase since the war in the number of families with sufficient incomes to create savings is an important reason for this trend. These new savers, unfamiliar with direct investing, are channeling their surplus funds into life insurance companies, savings banks, loan associations and mutual funds to be collectively invested by professional management. Another factor is the widespread adoption of pension programs, profit sharing plans, etc.

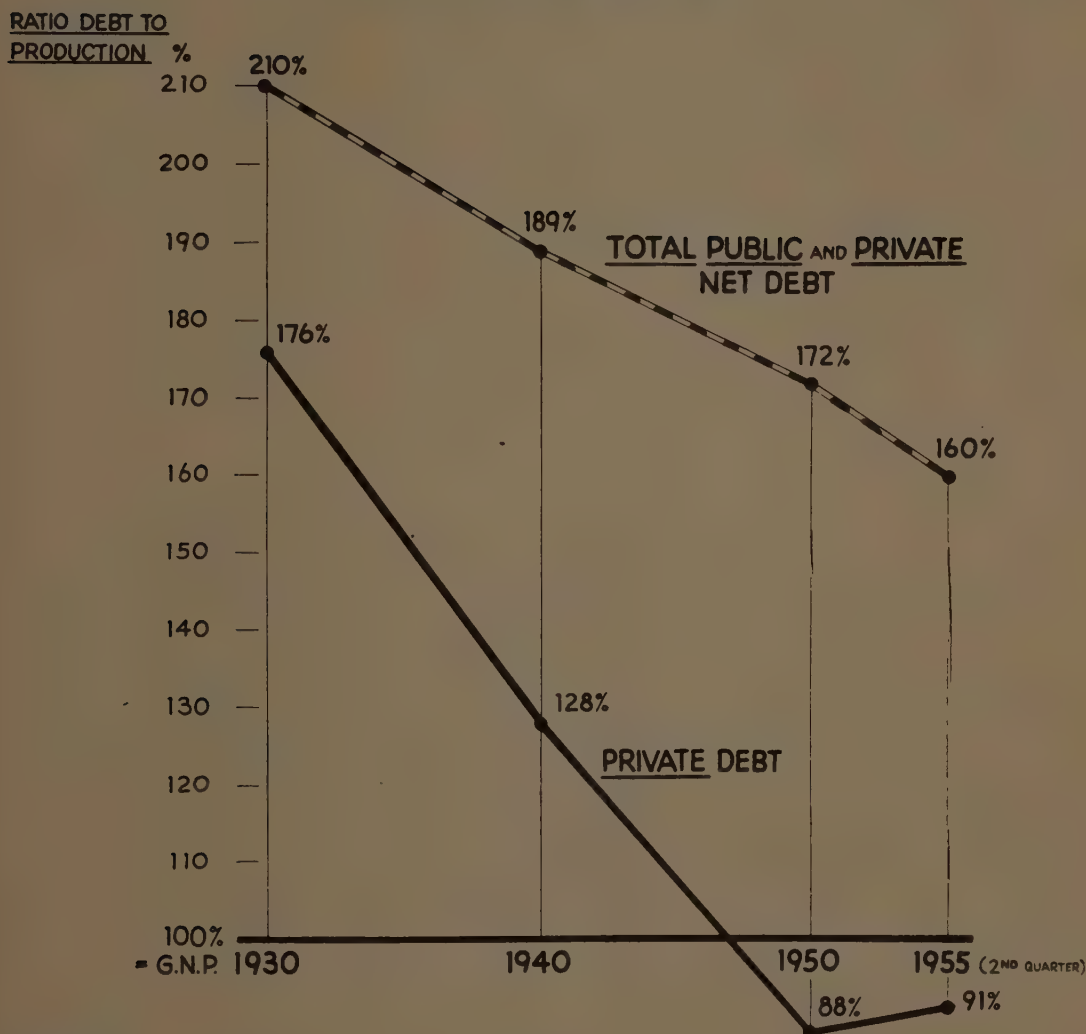
#### HOLDINGS OF COMMON

The market value of all publicly-owned common stocks outstanding at the end of 1954 was estimated at \$252 billion. Of this total, financial institutions owned \$25 billion or only 10%. If you include \$32.7 billion of personal trusts administered by banks and trust companies, which are individually owned but professionally managed, the total of professionally managed funds was 22% of the whole.

This amount is relatively small but it is increasing rapidly.

In 1954, net purchases of equities were estimated at \$2.1 billion. Of this total \$1.32 billion or 62% were added by

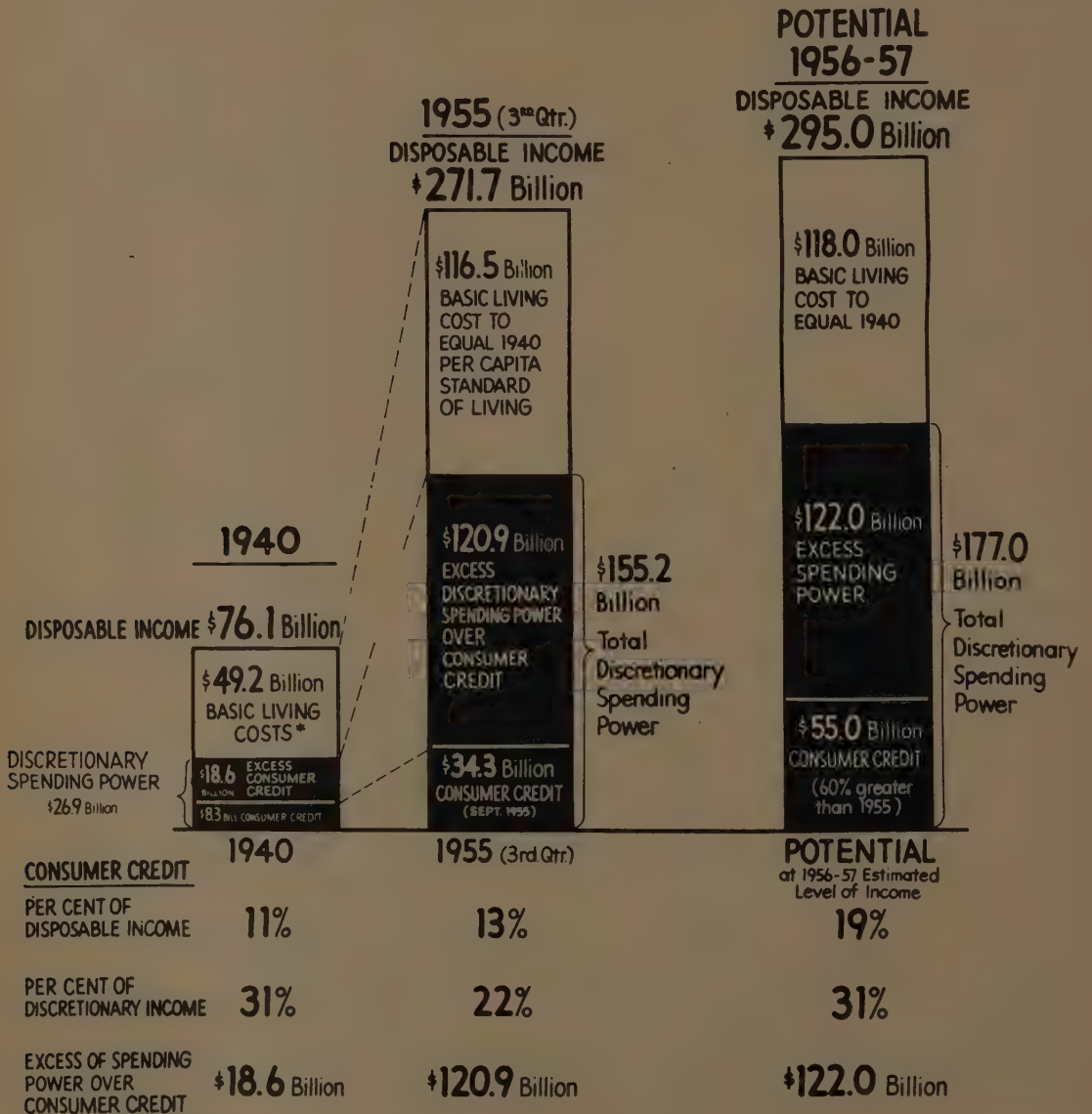
# HOW RATIO OF DEBT TO PRODUCTION HAS DECLINED



<u>BILLIONS</u>				
G.N.P.	\$ 91.1	\$ 100.6	\$ 285.1	\$ 384.8
NET PUBLIC AND PRIVATE DEBT	\$ 191.0	\$ 189.9	\$ 490.7	\$ 616.0 (EST.)
PRIVATE DEBT	\$ 160.4	\$ 128.6	\$ 251.3	\$ 349.0 (EST.)



# CONSUMER CREDIT COULD SAFELY EXPAND 60% BY 1957 WITHOUT EXCEEDING 1940 RATIO TO DISCRETIONARY SPENDING POWER



\* Food, Clothing, Shelter

institutional investors. If the \$200 million of professionally managed personal trust funds are added, the total is 72%. In addition, the market for fixed income obligations, corporate bonds and preferreds, is almost entirely institutional.

Probably as much as 80% of the savings of the country are now flowing into institutions. Because of their fiduciary nature, the professional managers are primarily interested in dominant companies with financial resources adequate to support the huge research programs necessary for continued progress. Of the new capital flowing into securities, the proportion directed by professional investment managers is increasing. They are now the dominating force in determining market price not the individual investor or trader. The securities which interest them have therefore been the most attractive to own in recent years.

Several years ago I made a compilation which aroused a good deal of interest. It shows that few people realize how diverse the action of the market has been over recent years. Regardless of the fact that the Dow-Jones industrial average has advanced for over five years with just a few minor interruptions, the action of various types of securities has been quite different. Many holders show losses on individual securities despite the fact that the general market has been in a broad advance since 1949. As always, it has been dangerous to buy the wrong securities at the wrong time. In the main, it has definitely paid to own quality issues over recent years. The following compilation may be of interest. It presupposes an investment of \$100,000 in four different groups of stocks at the 1946 highs. The first group is composed of twenty growth issues and presupposes an investment of \$5,000 each in such growth companies as Dow Chemical, Corning Glass, I.B.M., etc. The second group is composed of twenty stocks of investment quality. It was selected from the twenty favored issues of 130 common trust funds of leading trust companies. It includes such issues as General Motors, Standard Oil of New Jersey, General Electric, National Dairy, Sears Roebuck, etc. The third group consists of good quality dividend-paying issues a bit below the investment quality of the second group. It consists of issues like Allied Stores, Allis Chalmers, Babcock & Wilcox, National Gypsum, Sylvania Electric, etc. The fourth group consists of lower priced, more speculative issues. It comprises the twenty most actively traded issues in 1953 selling at around 20 or lower. It includes the issues in which the general public usually trade. It consists of issues like Armour, Avco, International Telephone, New York Central, Pennsylvania, Pepsi-Cola, etc.

The figures in the above mentioned compilation have been brought up to date and the results are shown below. Here is how the purchase of \$100,000 at the 1946 highs of each of these groups would have looked at October 5, 1956.

	1956 High	Oct. 5, 1956
Growth Issues	\$100,000	\$431,500
Investment Issues	100,000	260,300
Medium-Grade Issues	100,000	172,000
Low-Priced Issues	100,000	82,500

The most interesting thing to note about the above table is that the purchaser of low-priced speculative stocks at 1946 highs still has a loss ten years later.

As is evidenced by the above, this long range factor of professional management seems likely to grow stronger in the future.

These eight factors are not a complete list of all the long-run forces which have been at work in our economy over the past decade, but they are among the most important and they show few signs of diminishing in vigor—in fact several are gathering momentum. These long range trends deserve far more investment consideration than the short-range uncertainties that crop up from time to time.

To put it briefly, the long term outlook is for a renewal and continuation of the industrial and economic expansion that has been going on since the end of World War II. Also chances are that over the years there will be more inflation or cheapening of the dollar. One excellent investment policy is to have the common stock portion of your money invested in good quality growth companies that may be expected to share in the future growth of this country.

Now that we have the longer term market background in mind, we can more clearly analyze the shorter term trend of the market. At the moment, I see no reason to change the forecast of market action that I made at the beginning of 1956—namely, that the market, as measured by the averages, will continue to hold in a broad trading area for all of 1956 and probably well into 1957. In other words, my technical work indicates neither a broad advance nor a broad decline but a market in which individual issues will show excellent price action. My projection, made a year ago, was that the range of the Dow-Jones industrials for 1956 would be 520 high and 440-420 low. The range for 1956 has been 524.37 high and 458.21 low. The recent low was 463.83.

I would be inclined to believe that the market will remain in the 520-420 range (give or take a few points either way) for at least another six months and probably longer. Earnings for 1956 on the Dow-Jones industrial average will probably be just a shade lower than the \$35.73 earned in 1955 so there is no reason to expect a sharp advance such as was witnessed in 1955 when earnings increased over \$7.00 from the 1954 level. However, earnings of individual companies will show wide variance and it is here that profit opportunities will be available. This of course has been going on for some time and I believe the average investor is much wiser to watch the action of individual issues rather than the various stock market averages. For instance, the industrial average is now just a bit below the 490 high reached September a year ago prior to the announcement of President Eisenhower's illness. But witness the price action of several issues during the past year. Allegheny Ludlum was selling at 30 in September 1955 but despite the fact that the industrial average has done nothing, Allegheny Ludlum is now 63. As other examples, Dresser Industries has moved from 48 to 100 and Joy Mfg. from 28 to 72. These three have advanced almost 100% while the industrial average is just about where it was a year ago.

It is possible that the industrial average may hold above the recent low of 460, but unfavorable news developments could cause a decline to the strong 440-420 support level (the low after President Eisenhower's heart attack was 434



in October 1955). A decline to the 440-420 level is the worst I can envision from my technical work at this time and it is, of course, not certain that this will happen. Even if it does, individual issues will continue to move against the trend. The market action of the next year may be similar to 1951-1953 when the averages consolidated in a 15% trading range for twenty-eight months before embarking on the 1953-1955 advance. The present market has held in a similar trading range or consolidation area for only fifteen months.

For the longer term, I continue to remain bullish based not only on the eight factors mentioned earlier but also on the basis of my technical work and earnings projections. Based on recent study by Chase-Manhattan Bank on an

earnings projection for 1965 on the earnings on all United States companies and transposing this figure into terms of the Dow-Jones industrial average, it is possible that the industrial average will earn \$60 a share in 1965 as against probably \$34-\$35 for 1956. This would justify a price level of about 800 in 1965 and, if high investor confidence prevailed together with some overvaluation, it is possible that average would reach 1000. In any event, a level considerably above the present level could prevail in 1965 regardless of intermediate corrections. While the market as measured by the averages may do little pricewise over the next six months or a year, this period may be the last opportunity to buy the market in the 520-420 range before it moves ahead to a new and higher price plateau.



#### DIVIDEND NOTICE

The Board of Directors has declared a regular quarterly dividend of 25¢ per share on the common stock of this Company, payable January 4, 1957, to stockholders of record at the close of business December 17, 1956.



R. L. TOLLETT,  
President

Big Spring, Texas November 19, 1956

### GOULD-NATIONAL BATTERIES, INC.

SAINT PAUL, MINNESOTA

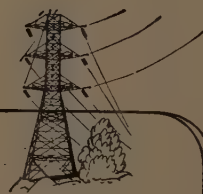
Manufacturers of Automotive  
and Industrial Batteries

#### DIVIDEND NOTICE

The Board of Directors today declared a dividend of 42½¢ per share on Common Stock, payable February 1, to shareholders of record January 18, 1957.

A. H. DAGGETT  
President

December 10,  
1956



### Southern California Edison Company

#### DIVIDENDS

The Board of Directors has authorized the payment of the following quarterly dividends:

COMMON STOCK  
Dividend No. 188  
60 cents per share;

PREFERENCE STOCK,  
4.48% CONVERTIBLE SERIES  
Dividend No. 39  
28 cents per share;

PREFERENCE STOCK,  
4.56% CONVERTIBLE SERIES  
Dividend No. 35  
28½ cents per share.

The above dividends are payable January 31, 1957, to stockholders of record January 5. Checks will be mailed from the Company's office in Los Angeles, January 31.

P. C. HALE, Treasurer

December 21, 1956



### The DIAMOND MATCH COMPANY

75th CONSECUTIVE YEAR  
OF DIVIDENDS

The Board of Directors of The Diamond Match Company on December 13, 1956, declared a regular quarterly dividend of 45¢ per share on the Common Stock. At the same meeting the Board also declared a quarterly dividend of 37½¢ per share on the \$1.50 Cumulative Preferred Stock.

Both dividends are payable February 1, 1957 to stockholders of record January 4, 1957.



PERRY S. WOODBURY, Secretary and Treasurer

MATCHES • PULP PRODUCTS • LUMBER • BUILDING SUPPLIES • WOODENWARE

## BUSINESS CONFERENCE

The never-ending search for oil takes men to strange places—even to ocean floors.

Here Mobil scientists, the first company team of research geologists trained as skin divers, probe the bottom of the Gulf of Mexico.

From their findings have come clues which may lead to the location of new oil reserves to strengthen the Free World—to guarantee you a continuous and abundant flow of the thousands of products made from petroleum to enrich your life.

Training geologists as skin divers is but one of Mobil's pioneering methods of exploring new petroleum frontiers in a world where oil is ever more difficult and expensive to find.

This progressive policy resulted in the first tapping of off-shore oil reserves out of sight of land—another example of Mobil's master touch in oil.

For more information about skin diving for oil, write to Room 2400, Socony Mobil Oil Co. Inc., 150 East 42nd Street, New York 17, N. Y.



SOCONY MOBIL OIL CO., INC.

Leader in lubrication  
for 91 years







• GLASS



• PAINTS



• FIBER GLASS • PLASTICS



# "Tall Oaks from Little Acorns Grow"

From a one-plant, one-product company in 1883, Pittsburgh Plate Glass Company has grown into a "tall oak" with many plants and many products.

There is hardly an industry or market which does not use one or more of the numerous products of "Pittsburgh Plate." For example, Pittsburgh's plate and window glass, mirrors, Twindow®—"the world's finest insulating glass"—and Herculite® Tempered Plate Glass are basic to the construction and renovation of homes, schools, factories, stores. Pittsburgh Paint is utilized in these structures to beautify and protect. And these same colorful and durable finishes are the overwhelming choice for motor cars, buses, trains, and for craft on sea and in the air.

Such Pittsburgh glass products as Duplate®, Duolite®, Solex®, and Herculite find ever-increasing use in the glazing of land, air, and sea transportation units. And in these, Pittsburgh fiber glass helps insulate against heat, cold, and sound. Also, Pittsburgh's fiber glass and Selectron® plastics are used in making appliances, boat hulls, molded furniture, and a wide range of products.

Pittsburgh's wholly owned subsidiary, Columbia-Southern Chemical Corporation, serves a large and diversified group of customers whose products are vital to the welfare of our nation. Food processing, agriculture, sanitation, paper, glass, chemicals, steel are but a few of the industries which look to Columbia-Southern for materials.

Yes, through sound policies and a progressive outlook, "Pittsburgh Plate" has grown into an important member of America's expanding industrial family.



PAINTS • GLASS • CHEMICALS • BRUSHES • PLASTICS • FIBER GLASS

**PITTSBURGH PLATE GLASS COMPANY**

IN CANADA: CANADIAN PITTSBURGH INDUSTRIES LIMITED



• MERCHANDISING

• CHEMICALS

# A Guide to the Federal Government's Indexes of Wholesale Prices

LAWRENCE J. KAPLAN\*

**B**USINESSMEN MUST CONSTANTLY MAKE price decisions to function effectively. Should they buy? Should they sell? How do prices today compare with prices in 1947?

Probably the most useful guide to price movements available to businessmen is the Wholesale (Primary Market) Price Index. This measure of price movements reflects changes in prices of goods at the time that the first commercial transaction is made. This transaction, called the primary market, is the first exchange made by buyers and sellers. The primary market in which commercial transactions are made may exist at various stages of production as a commodity is converted from raw material to finished product. Thus, for example, cotton is priced as raw cotton, as yarn, as basic fabrics (gray goods and print cloth), and as finished products (sheets, pillowcases, towels and shirts). Prices obtained at each of these stages of production are included in the index.

The word "wholesale" as used in the title of the index refers to sales in large lots. It does not refer to prices paid or received by wholesalers, distributors or jobbers. Most of the price data used in constructing the index are the selling prices of representative manufacturers. The index excludes all retail prices, prices for securities, real estate, services, construction, and transportation. Moreover, the index measures only the effect of price change and not changes in quantity or quality. The Wholesale Price Index may be defined, therefore, as a yardstick designed for measuring price movements in primary markets.

## BRIEF HISTORY OF THE WHOLESALE PRICE INDEX

The Wholesale Price Index is one of the oldest continuous statistical series issued by the Federal Government, and the oldest series prepared by the Bureau of Labor Statistics. The origins of the index are associated with a resolution of the United States Senate in 1891 which authorized the Committee on Finance to investigate the effects of the tariff laws on the prices of agricultural and manufactured goods. The Aldrich Report, issued by the United States Senate in 1893, contained the first index of primary market prices in the United States. The function of continuing this statistical series was assigned in 1884 to the newly organized United States Bureau of Labor, which became part of the United States Department of Labor in 1913 as the Bureau of Labor Statistics.

The original data included prices for about 250 commodities. This number slowly increased and by 1940 ap-

proximately 900 commodities were covered, based on approximately 2,000 separate price quotations. The 1952 revision doubled the number of commodities and quotations covered. Most of the additions were made in the area of manufactured products such as machinery, apparel, industrial chemicals and consumer durable goods. Today the United States Bureau of Labor Statistics has the largest single body of price data in existence.

## RANGE OF COMMODITIES INCLUDED

The Bureau of Labor Statistics compiles three wholesale price indexes; a monthly (also called comprehensive, because it includes about 2,000 commodities and covers the total of transactions at the production level of distribution), a weekly wholesale price index and a daily index. The range of products included in the Wholesale Price Index is extremely wide, including raw materials, semi-processed goods and manufactured goods. These commodities reflect, directly or indirectly, the sales of all products in the primary markets. Exports are included up to the point at which they leave the domestic market. Index data for commodities are based on about 5,000 separate price reports from the sample of price reporters. The value of commodities priced for the index is over \$200 billion per year.

For the monthly wholesale price index, prices are collected each month from manufacturers, trade journals and other sources. As closely as possible, the prices used are those which prevail on the Tuesday of the week in which the 15th of the month falls. After price data for the month are collected, they are tabulated by machine. The Wholesale Price Index is one of the Bureau's indexes whose calculations were completely mechanized. The system of calculation provides for mechanical electronic equipment to develop all the figures needed for the final indexes. The end result is photographed from the machine tapes for use in the final press statement.

## THE BASE PERIOD

The Wholesale Price Index is designed to measure month-to-month changes. The series compares current month's average prices for the commodities included with the previous month's average prices. Each month's indexes, however, are tied to the 1947-49 base period. For example, the Wholesale Price Index for September 1956 stood at 115.3 (1947-49=100). This means that the level of wholesale prices was then 115.3 per cent of their average level in 1947-49, or 15.3 per cent above the base period. The index figure, therefore, for a particular date shows the per cent change in the average level of primary market prices from the average prices of the same items for the years 1947, 1948 and 1949. The average prices for these years, the base period, are set to equal 100.0. The histori-

\*Mr. Kaplan is Chief Information Officer in the New York Regional Office of the U. S. Department of Labor's Bureau of Labor Statistics. The points of view expressed are the responsibility of the author and do not necessarily represent opinions or policy of the Bureau of Labor Statistics.



cal series for the average of all commodities of the wholesale price index (1947-49=100) is available back to 1749.

The selection of average prices for 1947, 1948 and 1949 as the base period does not imply "normality" for this 3 year period. The base period of an index number is selected rather to provide a uniform reference point, facilitating comparisons between any two dates. The postwar base (1947-49=100) was recommended by the Office of Statistical Standards of the U. S. Budget Bureau. It is used by all Federal Government agencies responsible for the preparation of index numbers, thus establishing uniformity and comparability. The only exceptions are the Department of Agriculture parity indexes which are still on a prewar base by Act of Congress.

#### CURRENTLY PUBLISHING INDEX SERIES

For the purpose of analysis, requiring historical series for the study of price movements, index numbers have been computed back to January 1947 for all groups, subgroups, product classes and individual commodities. For particular groups, subgroups and products, index numbers have been computed back to varying dates prior to 1947. For the period 1947-51, therefore, a set of analytic indexes on the base 1947-49=100 is available. For December 1951 and all earlier dates, however, the indexes previously published, on the base 1926=100, are the official price indexes. The official index may be defined as the best index that could be calculated with the information and resources available at the time. The 1952 revision, incorporating many improvements and based on 1947-49=100, does not replace the older index series in any of its formal uses. The revised wholesale price index, began February 29, 1952 with the issuance of the January 1952 index. This revised series is the official price index for January 1952 forward. Individual commodity prices and index numbers are available for the period since 1947 and for prior periods depending upon comparability of commodity specifications.

#### SAMPLING USED IN THE INDEX

In daily life people make judgments and act on the basis of a few carefully chosen facts. The Bureau of Labor Statistics relies on the same general principle. The index is based upon a sample of commodities, specifications, reporters, and primary-market levels of transaction. By using a small number of carefully selected items it is possible to obtain an almost exact picture of all commodities, specifications, and producers. Although a comparatively small list of commodities might suffice for a highly reliable summary all-items index, the Bureau includes about 5,000 quotations each month on about 2,000 separate items. This relatively large sample, in response to the needs of the users of the index, permits the development of reliable indexes for individual commodities, product classes, subgroups and groups of commodities.

To make the selection of commodities, specifications and reporters which would both reflect wholesale price trends and at the same time provide industry with the most important type of price information which they require for their operations, the Bureau worked closely with important trade associations and manufacturing groups. Through

these direct contacts with industry, the Bureau learns what business needs are and the best method for obtaining the data. Additional guidance is also obtained from other government agencies and from labor organizations. A special technical committee appointed by the American Statistical Association and a Business Research Advisory Committee representing business as a whole played an important role in advising the Bureau on the proper selection of its sample of commodities, specifications and reporters.

#### SPECIFICATIONS FOR INDIVIDUAL COMMODITIES

In order to price identical lists of commodities for each period, the commodities in the index are defined by precise specifications. These specifications incorporate all the characteristics of the commodities which bear upon price. For example, the precise nature of a specification may be illustrated by the specification for steel billets:

"Billets, rerolling, carbon steel, 4" x 4" x 10/15' long, chemistry - .10C, .30/.50 Mn, .05 Max. S, .04 Max. P, base quantity, mill to user, f.o.b. mill."  
(Product code 10-13-01)

The first part of the specification describes the general nature of the commodity and its physical characteristics: the type of billet is one which is rerolled and made of carbon steel; size 4" x 4" x 10/15' long and chemistry .10C, .30/.50 Mn, .05 Max. S, .04 Max. P. The last part of the specification describes the marketing characteristics of commodities: quantity (base quantity), level of transaction (mill to user), and delivery terms (f.o.b. mill). The price for this commodity is quoted per net ton.

The specifications were selected after careful consideration by government and other experts. Specifications, like the commodities themselves, were generally selected to describe the volume items in each commodity line. The specification selected, however, is not necessarily the volume seller. For example, 15/16 inch middling cotton is not a volume seller but it does represent all cotton based upon existing marketing practices. A specification once established is maintained as long as it adequately represents the commodities being sold in sizeable volume. Index number comparability from period to period is thus achieved.

#### SOURCES OF WHOLESALE PRICE DATA

The method of collecting prices for the Wholesale Price Index will now be considered.

The sources of the basic price quotations used in the Wholesale Price Index are manufacturers, commodity exchanges and organized markets, trade journals and various government agencies. Price schedules are mailed each month to about 5,000 price reporters representing all major industries in all parts of the country.

The Bureau collects these price data on a purely voluntary basis. Businessmen furnishing these prices cooperate with the full understanding that reporting is not compulsory. At the same time the Bureau protects its co-operators by publishing average prices only for those individual commodities for which at least three price quotations are available. By following this rule the price data for an individual manufacturer are never disclosed.

Trade journals are a second source of price data. When trade journals are considered reliable by competent observers in industry and in the Bureau, prices published in the journals are incorporated into the index. The Bureau constantly checks the validity of trade publication quotations. Some examples of items priced from this source include chemicals and textile items.

Organized exchanges and organized markets are a third reliable source. Examples of commodities for which wholesale prices are collected from organized exchanges include basic metals, printcloth and hides.

And finally, the fourth major source of wholesale price information is the government itself. When other Federal government agencies have to collect price data for their own needs, the Bureau of Labor Statistics uses these data in order to avoid duplication in collection. Examples of commodities priced through this avenue include fish, grains and livestock.

A distribution of commodity reports by source is approximately as follows:

<i>Source</i>	<i>Percent of Total</i>
Manufacturers	73
Trade Journals and Organized commodity markets	20
Federal agencies	7

#### PRODUCT CLASSIFICATION

The system of classification used in the Wholesale Price Index is essentially a product classification. About 2,000 individual commodities are classified into 15 major groups, 88 subgroups, and over 200 product classes. A product class approximates a grouping of commodities, produced by one or more related industries, with common raw materials, production processes, and similar price movements.

##### *Example of Classification of Commodities*

	<i>Number of Commodities Included</i>
LUMBER AND WOOD PRODUCTS (Major Group)	63
Lumber (Subgroup)	49
Douglas fir (Product class)	10
Southern pine " "	9
Other softwoods " "	15
Hardwoods " "	15
Rest of subgroups and product classes	14

In the major group "Lumber and Wood Products," for example, the 3 subgroups are "lumber," "millwork," and "plywood." In the lumber subgroup, the 4 product classes are "Douglas fir" containing data for 10 commodities, "Southern pine" with 9 products, "other softwoods" with 15 products, and "hardwoods" with 15 products.

#### SPECIAL PURPOSE INDEXES

No single classification can serve all purposes. The Bureau's detailed product classification is designed to allow easy reclassification, such as various special purpose indexes or the economic classification. For example, by regrouping commodities taken from several of the major groups and subgroups, it is possible to prepare a special monthly index of wholesale building material prices. Among the

items included in the building materials wholesale price index are brick and tile products, cement, lumber products, paint and paint materials, plumbing and heating items, structural steel products and miscellaneous building materials, such as window glass, builders' hardware, roofing materials and copper wire. In addition to building materials, other areas of the economy are similarly covered by special wholesale price indexes. Altogether 18 special indexes are published monthly.

#### ECONOMIC CLASSIFICATION OF PRODUCTS

The Bureau has developed an economic classification of the products included in the Wholesale Price Index. The economic classification, supplementing the product classification of commodities, groups price data included in the wholesale price index into important economic categories. The three major economic categories are crude materials for further processing; intermediate products; and finally finished goods. Each of these major economic categories are further subdivided into meaningful sub-categories. For example, the third category, "finished goods" is subdivided into "consumer finished goods" and "producers' goods." Consumer goods are further subdivided into foods, non-durable goods, and durable goods.

One of the criteria used in developing the economic classification has been end use of the item. When an item has more than one end use, each use is weighted in accordance with its importance in that use. For example, bituminous coal has six main uses: generation of electricity, metallurgical use in steel production, industrial space heating, domestic space heating, manufacture of gas, and coal derived chemicals and coking. The importance of each use was analyzed and an appropriate portion of the total transaction weight was assigned to each use. When an item is used for the same purpose by industrial consumers and by household consumers, the item is shown in both classifications with a percentage of its weight applied to each use. For example, an incandescent lamp provides light in the home as well as in the factory. Therefore, lamps are counted as both consumer finished goods and producers goods. A percentage of the item's weight is assigned in each classification, to reflect the proportion of total lamp production sold at wholesale for, respectively, home or industrial use.

Historical statistics for the economic classification are available for the years 1947-1954. Beginning mid-1955 indexes based upon the economic classification were released along with the regular monthly release of wholesale price indexes.

#### MAJOR MAINTENANCE PROBLEMS

The primary aim of the Bureau is the maintenance of a balance between keeping the index up-to-date and minimizing breaks in long period comparability. To achieve this, an index number of prices, like other statistical measures, must be periodically examined and revised, where necessary. Such an examination reviews the commodities priced, the types of prices used, the weights, classification of commodities and methodology. Major revisions of the Wholesale Price Index occurred in 1914, 1921, 1927 and



1951. Between major revisions, adjustments and improvements are made regularly.

#### AN EXAMPLE OF MAINTENANCE

In order to reflect accurately the importance of each commodity in the economy, the Bureau determines each commodity's relative importance, or weight. The weights used in the Wholesale Price Index are based on the dollar value of production for sale in 1947, the latest year for which a complete Census of Manufactures is available. All sales of goods by or to manufacturers or producers are included in the basic weights. The index, therefore, reflects the relative importance among groups and subgroups which prevailed in 1947. The same set of weights has been used for the eight year period, 1947-1954.

Detailed weights within product groups and subgroups are reviewed periodically. During 1954 a revision of the weighting diagram for the wholesale price index was developed. The Census Bureau, based on abbreviated censuses of manufactures for 1952-53, prepared a set of figures on value of production for sale. The Bureau of Labor Statistics incorporated these data into the Wholesale Price Index. The revised weights became effective in index movements starting with the calculation of the final January 1955 index.

The first publication of each index is preliminary. The second publication of each index is final and the "official" index of the Bureau. Due to widespread use of the indexes in contract escalation and for other similar purposes, the Bureau has taken the position that once an index is published as final, it will be considered as the "official" index. Subsequent corrections or revisions do not supersede the second publication of the monthly series as "official." Any corrections or revisions of the basic data which improve the indexes subsequent to the final publication may, however, be issued when necessary and resources permit. Such changes are accompanied by a full explanation of the nature of the differences from the official series.

Estimated prices are not published, but relatives based on estimated prices are published. Within the limits of reproduction resources an appropriate footnote or a general note "price not available for publication" is used in all reports when the price is not published. In all cases where a composite price is based on quotations from individual reports, no price is published when less than three reporters are included in the sample for the items. Quotations from trade journals or other agencies are considered as based on many reporters and are published regularly.

#### CALCULATING THE INDEX

The calculation principle is briefly as follows: For each commodity the percent change in average prices for the current month as compared with the previous month is calculated. The previous month's index for each commodity is then adjusted to account for the percentage price change, thus providing the current month's index. In short, the individual commodity indexes are computed by chaining together the month-to-month price relatives. The more inclusive groupings, such as product classes, subgroup, group and total indexes, are formed by combining the individual

commodity indexes employing weights which reflect their importance in the United States economy.

This method of calculation has many advantages. It permits easy substitution of one commodity for another. Substitution of new weights for old weights is simplified. And, finally, the procedure lends itself to automatic calculation with built-in mechanical checks.

#### MACHINE TABULATION

When all the prices for the month have been received, they are carefully reviewed by commodity experts. These experts make certain that any changes in the reported prices are in line with those of the rest of the industry as well as with other reports from the same company for different items or for the same item at earlier dates. Quotations which vary significantly from the previous month's price or from the prices of other reporters are double checked.

After the prices are checked and approved by commodity experts in the Bureau, they are transmitted to the machine tabulation division. Thousands of calculations are performed. The final report in the form of a machine tape is used for photographic reproduction.

The Bureau has set up an elaborate system to be certain that the data cannot be manipulated in any way, thus insuring wide acceptance of the indexes.

#### WEEKLY WHOLESALE PRICE INDEX

The weekly wholesale price index represents the Bureau's best estimate of what the monthly comprehensive index would be if it were computed each week. The weekly index is based on actual prices for fewer than 200 commodities as compared with approximately 2,000 commodities in the monthly index. The comprehensive monthly wholesale price index may include prices submitted by as many as 30 reporting companies for a particular commodity. In the weekly index these 30 companies may be represented by only one company.

As soon as a monthly index is published, all weekly indexes falling in that month are superseded, and no attempt is made to make them a continuous series. The purpose of the weekly index is merely to supplement the monthly historical series. However, the weekly index number for the week containing the 15th of the month is usually equivalent to the monthly comprehensive wholesale price index. When differences do occur, they usually are not more than one-tenth of an index point above or below the monthly comprehensive index for all items.

The weekly wholesale price index is released every Friday at 2:00 p.m., and includes index numbers for the week ending the previous Tuesday. The method of calculation follows closely the technique used to compute the monthly index.

#### DAILY INDEX OF SPOT MARKET PRICES

The daily index of spot market prices is designed to measure price movements of 22 selected commodities. These commodities in standardized qualities are traded in a fairly large volume on spot markets and organized exchanges. This index is a sensitive measure of traders' estimates of current and future economic trends.

The commodities included in the daily index are either raw materials or commodities very close to the initial production stage. By excluding fabricated products and most semi-fabricated products and by carefully selecting commodities which are particularly sensitive to price changes, the daily index of spot market prices is more sensitive than the Bureau's monthly wholesale price index. The influence of some international markets upon the economy is also reflected by the inclusion of various commodities which are important in international trade.

The base period is the same as the monthly and weekly wholesale price index—the average of prices for the 3 years, 1947, 1948 and 1949. The daily index is computed in such a manner that price differentials among the commodities have no distorting effect upon the index numbers.<sup>1</sup> Thus, for example, a 10-percent change in the price of butter which is quoted in cents per pound has the same effect as an equal percent change in the price of steers which is quoted in dollars per 100 pounds.

In addition to the index based upon the prices of all 22 commodities, indexes are calculated and published for two major classifications, "foodstuffs" and "raw industrials," and four major product groupings: "Livestock and products," "metals," "textiles and fibers," and "fats and oils." Not all commodities fall into one of these four product groups. For example, sugar is not included in any of the four groupings. Nor is each grouping unique. Lard, for example, is included in the group indexes for both "livestock" and "fats and oils." These group indexes are based on the prices for relatively few commodities, all of which are extremely price sensitive. They are, therefore, in no way comparable to the corresponding groups in the comprehensive wholesale price index.

Each Tuesday release contains indexes and prices for each of the six preceding trading days, that is, Tuesday to Tuesday. Daily releases contain indexes and prices for every trading day from and including the previous Friday.

The Bureau collects and publishes prices for five commodities (barley, coffee, copper ingot, lead, and shellac), because of public interest in the actual daily prices of these commodities. The prices for these commodities, however, are not used in the computation of either the "all commodities" index or any of the special group indexes.

#### THE RELATIONSHIP BETWEEN THE WHOLESALE PRICE INDEX AND THE CONSUMER PRICE INDEX

A comparison of movements in the Bureau of Labor Statistics wholesale (WPI) and consumer price (CPI) indexes over a long period of time and over many selected short periods will show considerable similarity. The reasons for this similarity of movement are twofold. The first reason is that long-run changes in the level of the WPI involve a somewhat similar change in prices paid by retailers. A second reason is that common cost factors enter into prices for a commodity used by a manufacturer in further production and a commodity purchased by a consumer. For example, the price movement of a textile machine may resemble that

of an automobile, because the manufacturers of both pay the same prices for steel and labor.

While the WPI and the CPI show similar movements in the long run, in periods of rapid price changes the wholesale and consumer price indexes may diverge considerably, and may even move in opposite directions. The reasons that short-run variations in the index movements may be expected include first, the differences in composition of the two indexes; secondly, the time lags between primary-market price changes for the raw, semi-manufactured, and manufactured goods included in the WPI and the retail-market price changes for the finished goods included in the CPI; and thirdly, the technical difficulties of incorporating into the indexes the prices of goods which are sold at certain seasons.

**Differences in Composition.** The WPI and CPI differ in what they measure. The CPI is designed to measure the average changes in the retail prices of a fixed, specific, market basket or shopping list of goods and services bought by families of wage earners and moderate-income workers in large cities. It is not intended to measure all retail prices. The WPI, by contrast, is a measure of price movements at the primary-market level.

Moreover, the WPI is an index of the prices in primary markets of commodities at various stages in the productive process and includes commodities only. Many of these commodities never enter consumer markets. The CPI includes the prices of all the different kinds of things for which consumers spend money, including rents, medical and dental care, and utilities, such as telephone service.

**Differences in the Time Lag.** No consistent time lag exists between the change in price of a raw material and that of a finished product in the primary markets. Similarly, no consistent time lag exists between the change in price of the finished product in the primary market and the change in its retail selling price to the individual consumer. These lags may vary from a few hours to many months.

At one extreme, the price of tomatoes at wholesale at 4:00 a.m. in New York City's Washington Market is reflected at retail all over New York City when the stores open at 9:00 a.m. the same morning. If commodities such as this had enough weight in each index, the CPI and WPI would exhibit closely similar movements. At the other extreme price increases in raw wool may be reflected in the prices of wool-apparel items at the clothing manufacturers' level about a year after the rise in price of the raw material. In the case of some meats price changes at the retail level precede price changes in primary markets.

**Seasonal Commodities.** Certain commodities, which are sold for seasonal use, raise a technical problem in the indexes. For example, a fur-trimmed coat or an overcoat appears in the stores late in the summer or early in the fall. The Bureau must incorporate in its indexes the price changes between the end of one season and the beginning of the next. Although no real market price exists during the off season, price changes are accruing even when the item is off the market. End-of-season prices are generally lowered in order to dispose of seasonal merchandise, and early season prices tend to be as high as the traffic will bear.

The price problem of seasonal commodities, however, is

1. The daily index is an unweighted geometric mean of the individual commodity price relatives, which for each commodity is the ratio of the current price to the base period price.



largely a matter of timing differences. Bureau practice is to incorporate these accruing prices at the beginning of the new season—a time that is later for the CPI than for the WPI. In the month when such a change enters into the CPI a divergence may be created from the WPI, and vice versa.

#### USES AND LIMITATIONS OF THE MONTHLY WHOLESALE PRICE INDEX

The main use for the wholesale price index is to measure price movements in primary markets over time. Many users of the wholesale price index apply it to the solutions of particular problems. Among the uses of the index which have come to the attention of the Bureau are the following:

1. Barometer of business conditions: The monthly index measures the condition of the economy, and is frequently used as an economic indicator. Price movements reflect strengths and weaknesses in the economy. Labor and management make use of this index as a barometer of business conditions. Administrators in government use the wholesale price index in the formulation and administration of economic policies as well as in measuring their effectiveness.

2. A tool in contract escalation: The Wholesale Price Index is a useful tool in contract escalation. Specific segments of the Index (frequently coupled with the Bureau's series on wages or earnings in specific industries) are used to adjust for changes in the prices of the raw and semi-finished materials which go into the construction of a finished product which must be produced or constructed over a period of time.

For example, the construction of a cargo vessel takes many months, and with rapidly changing prices, it is not possible to establish a final delivery price when construction starts. Therefore, a contract for a ship might well contain provisions like these: "The base price of this vessel, \$X, shall be adjusted as follows: 40 percent of the base price will be increased or decreased by the change in the Bureau

of Labor Statistics' index of wholesale prices for Metals and Metal Products between the date of this contract and the final delivery date; an additional 40 percent will be similarly changed in accordance with the change in wage rates as measured by the Bureau of Labor Statistics' series of hourly earnings of workers in shipyards." This provision is an attempt to protect both parties against a change in the prices of materials, some of which may not be purchased for many months, and in wage rates, by the use of unbiased or neutral data.

In any individual case the index may not be a highly precise measure of the change in the prices of the specific materials entering the final product. However, even a rough measure is frequently superior to attempts to agree on a final price after the completion of the project, or to go through a constant series of negotiations during production.

The high degree of competition in the American economy, the extent to which various materials can be substituted for each other depending upon price differentials, and the fact that markets are generally open to public inspection or knowledge, all work toward creating a general price pattern. Most commodities, among broad groupings at least, seem to follow both the same trends and short-time movements within reasonable limits. That is, one basic metal does not move far out of line from the average of all other metals for very long; similarly the various fabrics and fibers, chemicals, woods, and other such products are all competitive to a degree.

Therefore, the use of a general or broad index like the Bureau's wholesale price index, even though it may not actually contain the price of the specific materials that enter into the final product being escalated may be perfectly satisfactory as a measure of specific price trends.

3. A means of stabilizing the purchasing power of the business dollar: The Wholesale Price Index is used as a means of stabilizing the purchasing power of the business dollar in a long-term contract—for example, the long-term lease for business, industrial, or commercial property; a royalty or patent licensing agreement; or the continuous delivery of a commodity or service such as natural gas or electric power. In these contracts, the base price is established, and is then adjusted periodically by the changes in the index.

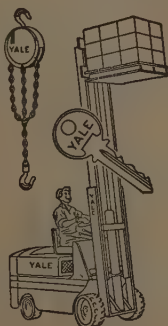
Frequently these changes are restricted to pre-determined limits, such that a rise or fall in the price above a certain amount opens the way for a complete renegotiation of the contract. Or it might be agreed that the price will only be adjusted when the index moves a certain number of points or a certain percent.

4. Buyers and sellers guide to prices: Purchasing agents and sales managers are interested in comparing both the amounts they pay for goods and the movement of their own prices against the index. These buyers and sellers of commodities are interested primarily in the group, subgroup or individual price series rather than the total index. If the Bureau of Labor Statistics shows a 5 percent price increase for a commodity between 2 months and the purchasing agent is quoted a price which is 10 percent higher, then he is in a position to question his supplier. In this manner,

## YALE & TOWNE

### Declares 275th Dividend

**37½¢ a Share**



On Nov. 29, 1956, dividend No. 275 of thirty-seven and one-half cents per share was declared by the Board of Directors out of past earnings, payable on Jan. 2, 1957, to stockholders of record at the close of business Dec. 12, 1956.

**F. DUNNING**

*Executive Vice-President and Secretary*

**THE YALE & TOWNE MANUFACTURING CO.**  
Cash dividends paid in every year since 1899

buyers and sellers are able to check their price against the movement of prices charged for competing or alternate products.

5. Other uses: Businessmen also use the wholesale price index in budget making and review, in planning the cost of plant expansion programs, in determining depreciation allowances and asset valuation, in market research, in deflation of dollar value series, in valuations of construction costs, in international price comparisons and in tax accounting.

Labor groups use the wholesale price index for review of the economic situation, for wage rate escalation and wage negotiation.

In combination with other data, agencies of the Federal, state and local governments use the index to fulfill a variety of functions. The United States Congress uses the W.P.I. as a tool in reviewing the economic situation, in formulating economic and fiscal legislation and in measuring the effectiveness of particular legislation.

Generally, users of the wholesale price index apply it to determine what the changes in the value of the dollar have been over a period of time.

#### LIMITATIONS OF THE WHOLESALE PRICE INDEX

The wholesale price index like any statistical series has certain limitations. The index is not a perfect over-all measure of the "general price level" or the "purchasing power of the dollar," even though it is often used to fulfill this function. The fact that the index does not measure all prices is not a defect. It is merely important to understand precisely what the index does measure. To measure accurately the general price level the index would have to include such

classes of commodities as real estate, securities and services. These are currently excluded. Moreover, the index measures price movements in primary markets only, and excludes retail transactions, as well as jobbing and speculative trading. In spite of these limitations, the wholesale price index reliably measures primary market prices, and thus satisfies the need for which it was constructed.

#### SUPPLEMENTARY MATERIALS

A number of supplementary materials are available to users of the Wholesale Price Index. These include specifications, item weights, historical materials and other records. In addition, the Bureau issues periodic releases and reports which keep the various Wholesale Price Index series current. The periodic publications listed below are available to the public free of charge.

*Wholesale (Primary Market) Price Index.* (Monthly release). Indexes of primary prices for major commodity groups and subgroups for reference month and an analysis of price movements from selected earlier dates. Available within two weeks after end of reference month. (9 pages—mimeographed).

*Prices and Price Relatives for Individual Commodities.* (Monthly report). Preliminary indexes for the reference month and final indexes and average prices for the previous month for about 2,000 individual commodities. Available about one month following reference month. (10 pages—multilithed).

*Whole Price Index.* (Weekly release). Indexes for "all commodities" and "all commodities other than farm and foods". Indexes for selected groups include "farm products", "processed foods" and "meats". Available within one week of reference date. (2 pages—mimeographed).

*Daily Index Numbers and Spot Primary Market Prices.* (Daily release). Spot price quotations for 22 commodities and daily indexes for the 22 commodities combined and for 6 special groups of commodities. (2 pages—mimeographed).



ALLIED CHEMICAL & DYE  
CORPORATION

#### DIVIDEND

Quarterly dividend No. 144 of \$.75 per share has been declared on the Common Stock of the Company, payable March 8, 1957, to stockholders of record at the close of business February 15, 1957.

RICHARD F. HANSEN,  
Secretary

January 29, 1957

**Continuous Cash Dividends  
Have Been Paid Since  
Organization in 1920**

## BOSTON EDISON COMPANY

#### Preferred Dividend

A quarterly dividend of \$1.06 per share has been declared, payable on the first day of February 1957 to holders of record at the close of business on January 10, 1957 of the Company's Cumulative Preferred Stock, 4.25% Series.

#### Common Dividend No. 271

A quarterly dividend of 70 cents per share on the Common Stock of the Company has been declared, payable on the first day of February 1957 to stockholders of record at the close of business on January 10, 1957.

Checks will be mailed from Old Colony Trust Company, Boston.

ALBERT C. McMENIMEN  
Treasurer

Boston, December 21, 1956

## RADIO CORPORATION OF AMERICA



#### Dividend Notice

The following dividends have been declared by the Board of Directors:

#### First Preferred Stock

87½ cents per share on the First Preferred Stock, for the period January 1, 1957 to March 31, 1957, payable April 1, 1957, to stockholders of record at the close of business March 11, 1957.

#### Common Stock

An extra dividend of 50¢ per share and a quarterly dividend of 25¢ per share on the Common Stock, payable January 28, 1957, to stockholders of record at the close of business December 19, 1956.

ERNEST B. GORIN,

Vice President and Treasurer

New York, N. Y., December 7, 1956





## THE FLINTKOTE COMPANY

New York 20, N. Y.

A quarterly dividend of \$1.00 per share has been declared on the \$4 Cumulative Preferred Stock payable March 15, 1957, to stockholders of record at the close of business March 1, 1957.

A quarterly dividend of \$.60 per share has been declared on the Common Stock payable March 15, 1957, to stockholders of record at the close of business March 1, 1957.

WILLIAM FEICK, JR.,  
Treasurer

February 6, 1957.

## ROME CABLE

*Corporation*  
ROME - NEW YORK



### 71st Consecutive Dividend

The Board of Directors of Rome Cable Corporation has declared consecutive Dividend No. 71 for 35 cents per share on the Common Capital Stock of the Corporation, payable January 4, 1957, to holders of record at the close of business on December 14, 1956.

A stock distribution of one share of Common Capital Stock for every twenty shares of Common Capital Stock was declared, payable January 4, 1957, to holders of record at the close of business on December 14, 1956.

GERARD A. WEISS, Secretary  
Rome, N. Y., November 29, 1956

Manufacturers of

## AMERICAN ENCAUSTIC TILING COMPANY, INC.

COMMON STOCK DIVIDEND

Declared January 16, 1957

15 cents per share

Payable February 28, 1957

Record Date February 14, 1957

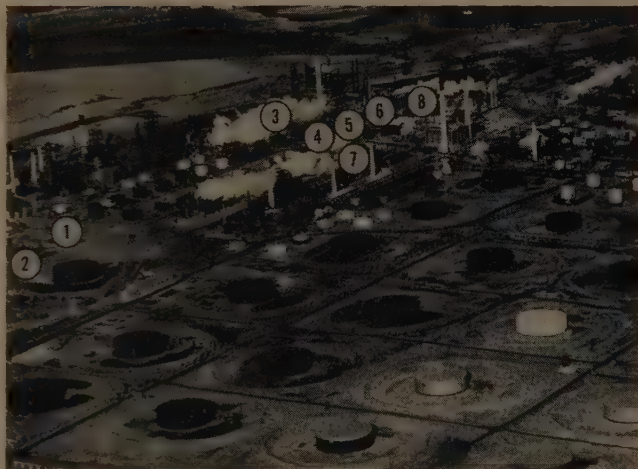
America's OLDEST Name in Tile



Ceramic  
Wall &  
Floor  
Tile



**Sunray Mid-Continent has started an eight to ten million dollar expansion program at the Company's two refineries operated by D-X Sunray Oil Co. at Tulsa and Duncan, Oklahoma. This**



**TULSA IMPROVEMENTS:** 1. Reformer; 2. Hydrogenation; 3. Cooling Towers; 4. 5. & 6. Storage; 7. Boilers; 8. Alkylation.

**project, when completed, will increase the production of high octane gasoline that will be needed to meet the upward sales trends of the Company's D-X Sunray products. There are hundreds of gasolines – But only one D-X Lubricating gasoline!**

D-X is the brand name of quality products manufactured by D-X Sunray Oil Company, a wholly-owned subsidiary.

**SUNRAY MID-CONTINENT**

*Oil Company*

GENERAL OFFICES

SUNRAY BUILDING

TULSA, OKLAHOMA

# Preparing an Oil Share Analyzer

MICHAEL KOURDAY

**T**HE OIL ANALYST THINKS himself fortunate in having the enormous wealth of figures available for the study of his field. Industry statistics are not only plentiful but they are complete, making the task of interpretation relatively easy. Company statistics present an opposite situation. Though an abundance of facts and figures are provided, a great deal of consideration is required to evaluate each company, especially in its relationship with others. For the oil analyst, who concentrates his major efforts in this endeavor, such detailed studies are a matter of routine. It is often a serious problem to the non-specialist whose routine does not always leave time to prepare exhaustive surveys. Fortunately, there is a simple solution to this problem. By the careful selection of some data and the elimination of others, a basic set of statistics may be organized into a sort of "Oil Share Analyzer." Some shortcomings inevitably arise from necessary omissions, yet this "Analyzer" will offer an efficient and reasonably complete picture of relative values. It might even be argued that the plan's very succinctness is one of its virtues, since it forces the analyst from a too-easy reliance on bare figures to a consideration of important but less tangible factors.

## SETTING UP THE "OIL SHARE ANALYZER"

Before starting the preparation of an "Oil Share Analyzer," it is necessary to determine some classifications. It will be found that most oil companies fall into one of the four general groups: International (e.g., Gulf, Jersey); Integrated-Producers On Balance (Humble Oil, Skelly); Integrated Refiners On Balance (Cities Service, Sinclair); and Producers (Amerada). For each of these classifications, some slight variations will be made, but the basic principles of the "Oil Share Analyzer" will prevail.

Once the classifications have been determined, the pertinent statistics may be selected and recorded. Following are listed the topics which appear to provide the most useful information. For the sake of brevity, only those topics will

be discussed in any detail which may need interpretation because of their specialized relationship to the oil industry. Because it is a compact group, figures for Integrated-Producers on Balance have been used to demonstrate how the analyzer works.

It is obvious that a comparison of certain balance sheet items is an essential factor in any analysis. Furthermore, the availability of these figures will prove helpful in other calculations which are occasionally required. The investment figure is included, since many oil companies have sizable holdings in other oil issues. When properly footnoted, this often serves as a welcome reminder.

Selected income statistics are extremely important in helping to interpret the relative value of oil shares. Gross revenues and net income give a quick insight into a company's relative size and earning power. It will be noted that no attempt is made to show profit margins. The reason for this is that the amount of profits carried down to income is apt to be a poor measurement of an oil corporation's efficiency. The company producing the largest amount of crude in relation to other operations will generally show the widest profit margin. While the analyst would undoubtedly like to know the relative efficiency of such factors as marketing and manufacturing, this is usually made impossible by the oil company's practice of lumping all cost figures together.

Perhaps the most revealing item to be derived from an oil company's income statement is "cash flow." As generally defined, this figure represents net income plus items on the income statement which require no cash outlay. While cash flow can be computed for all companies, it has particular significance in the oils because of the special tax treatment accorded the industry. For this reason, it is a better reflection of earnings power than is net income. It is also constructive in placing companies on a more comparable earnings basis since different accounting procedures are used in arriving at net income. However, the most salient fea-

## BALANCE SHEET STATISTICS

	Continental Oil	Humble Oil	Ohio Oil	Skelly Oil
<b>CAPITALIZATION (1)</b>				
Debt	\$ 107,545	\$ 23,282	\$ - - -	\$ 8,698
Preferred	- - -	- - -	- - -	- - -
Common (in shares)	9,767	35,855	13,127	5,746
<b>WORKING CAPITAL (1)</b>				
Current Assets	\$ 168,828	\$ 214,184	\$ 109,057	\$ 80,481
Cash & Equivalent	55,263	44,779	53,704	31,323
Current Liabilities	62,822	136,050	32,167	30,557
Net Working Capital	106,006	78,134	76,890	49,924
Investments	- - -	- - -	- - -	- - -

(1) in Millions



INCOME STATISTICS	Continental Oil	Humble Oil	Ohio Oil	Skelly Oil
Gross Revenues	\$ 528,944	\$1,078,245	\$ 257,165	\$231,639
Net Income	46,359	174,997	41,255	32,240
Dep & Dep.	26,052	82,074	21,649	28,853
Other non-cash charges	48,901	48,909	21,982	11,548
Total non-cash charge	74,953	130,983	43,631	40,401
Cash flow	121,312	305,980	84,886	72,641
less dividends	27,793	82,827	20,346	10,343
less debt amortization	588	1,000	- -	- -
Adjusted cash flow	92,931	222,153	64,540	62,298
Capital Expenditures	100,603	210,420	39,049	47,746
Balance	( 7,672)	(11,733)	25,491	14,552

ture of an oil company's cash flow figure is that it represents the funds available from operations for further exploration, as well as for expansion of other activities.

Yet, despite the widely accepted usage of cash flow as a measure of relative values, there are a couple of points where a little clarification may prove helpful. Part of the problem arises from the fact that there is no general agreement as to the items it should encompass. There is very little question about the majority of the common components of cash flow—depreciation, depletion, lease abandonments and intangible drilling costs. In the case of depreciation and depletion, no problem exists. Lease abandonment charges are also readily acceptable, since these costs are usually incurred in earlier years (with minor exceptions), thus representing no actual cash outlay when charged to the income account. Justification can also be found in the use of intangible drilling costs, since this, in effect, is a capital item which has been expensed, thus saving tax dollars. Few companies show intangible drilling costs in their reports to stockholders, so the analyst seldom has the advantage of this figure. There has been some rather serious opposition to the use of dry hole costs in cash flow. Perhaps the reason many analysts accept this figure as a cash flow item is that while it does represent an actual cash outlay, it also saves tax dollars. To the opponents of this usage, this appears to be a weak argument, since other costs (geologists, lease rentals and other exploratory charges) accomplish the same thing yet are not considered in cash flow. Also, the inclusion of this figure can create the apparent contradiction that the more dry holes a company drills, the more reasonably priced it becomes on a cash flow basis. In spite of this objection, it seems simplest to use this figure because a majority of companies follow a practice of lumping dry hole costs together with other non-cash charges.

Although the total cash flow figure is often considered

a satisfactory yardstick for comparisons, it is really not complete enough for this purpose. Since many companies must use a portion of their cash flow to retire debt, such payments should be deducted. Furthermore, as the chief function of cash flow is the provision of funds for new exploration and expansion, it is also advisable to deduct dividend payments. Some idea of the significance of these deductions can be seen in the following example. In 1955, Argo Oil and Southern Production total cash flow amounted to \$8.1 million and \$10.3, respectively. However, after adjusting for debt and dividend payments, Argo's adjusted cash flow equalled \$6.1 million versus \$5.3 million for Southern Production.

By putting the capital expenditure account below this important adjusted cash flow figure in the "Analyzer," the analyst can readily determine whether or not the past year's operations generated sufficient funds internally for exploration and other capital programs.

The life blood of an oil company is its production and its reserves of oil and gas. No difficulty is encountered in obtaining production figures (although a few companies still do not report natural gas production). For convenience, natural gasoline and other liquids should be included with crude oil.

By contrast, it will be found that getting fairly reliable reserve figures is a rather arduous task. On the average, only about half of the companies in the industry regularly report their reserves. A certain amount of digging is required to obtain figures for the others. The most fruitful supplementary sources for reserve estimates are the prospectuses prepared by oil companies during sales of new securities. Where no figures are available, the analyst must form a judgment, as best he can, on the basis of such facts as are accessible. Some help will be found in the fact that the nation's crude reserves have an estimated life of approximately 12 years (however, experience indicates that when

PRODUCTION STATISTICS	Continental Oil	Humble Oil	Ohio Oil	Skelly Oil
1954 Crude Prod. bbls. (daily)	135,722	362,900	93,578	61,081
1955 Crude Prod. bbls. (daily)	145,503	389,900	98,404	68,014
1955 Crude Prod. (Total)(000)	53,109	142,341	35,918	24,825
1954 Nat. Gas Prod. MCF (000)	129,800	335,111	76,700	116,786
1955 Nat. Gas Prod. MCF (000)	127,600	371,863	93,300	120,455
Crude Reserves bbls. (000)	800,000(e)	3,000,000	665,500	450,000 (e)
Natural Gas Reserves MCF(000)	2,500,000(e)	16,000,000	2,110,000	2,500,000 (e)

REFINING STATISTICS	Continental Oil	Humble Oil	Ohio Oil	Skelly Oil
1954 Refinery Runs (daily)	125,479	228,499	37,286	45,903
1955 Refinery Runs (daily)	138,613	247,806	42,421	46,697
1955 Refinery Runs Total (000)	50,594	90,449	15,484	17,045
Production as % of Refinery Runs	104.9	157.3	231.9	145.6

multiplying production by 15, one gets closer to the mark) and gas reserves, at 1955 production rates, will last 24 years. Making allowances for individual circumstances, a satisfactory figure can be arrived at. Following such a procedure on Texas Pacic Coal & Oil, for instance, this company's reserves were estimated to be in the area of 100 million barrels. Sometime after this computation had been made, interestingly enough, the company announced that, based on four different studies, its reserves were between 75 million barrels and 115 million barrels, indicating that the 100 million barrel figure was a good approximation.

Some amount of judgment must also be used in evaluating published reserve figures. For example, Socony Mobil reports its reserves on a gross basis. These should be adjusted to a probable net figure in order to make them more comparable. Since the average royalty interest is an eighth, reducing the reserves by this amount would bring them more in line with other companies. Sometimes it will be found that reserves have been estimated on the low side. Continental Oil, for instance, in a prospectus covering its \$100 million bond issue in October 1954, stated that its crude reserves were in excess of 600 million barrels. However, based on the known reserves of other companies having a similar rate of production, it would appear that Continental's reserves were probably closer to 700 million barrels.

Because of the increasingly international scope of oil company operations, the treatment of foreign production and reserves must be considered. For predominantly domestic companies, the simplest and most practical solution is to combine all reserves into one figure. For the most part, foreign reserves will be located in Canada. Although the in-the-ground value of these reserves is below those in the United States, the difference will not be large enough

to distort the over-all picture. Furthermore, a footnote will serve as an effective reminder of the makeup of the figure used. In establishing an Analyzer for the international companies, a different procedure should be followed. Here it is advisable to segregate all available figures on domestic, other western hemisphere and eastern hemisphere operations, since foreign activities are important factors in evaluating these issues.

The above figures should be included for those companies engaged in refining. While refinery figures do not play a very significant role in the "Analyzer," since it is an almost insurmountable problem to determine how much of the investor's dollar goes to purchase refining and marketing facilities, these statistics do offer interesting information. However, these non-producing activities can be more realistically evaluated by using the "appraised worth" method of determining relative values which is discussed later.

At this point, a number of pertinent figures have been converted into per share statistics. Obviously, those on earnings, cash flow, dividends and book value need no explanation. To arrive at the other per share statistics, however, calculations and adjustments sometimes have to be made. In the case of crude production, for instance, some deductions may be necessary before dividing by the number of shares outstanding. In order not to penalize those companies with no senior capitalization, production is reduced by one barrel for each \$2.50 (this amount is used rather than the average field price of Mid Continent crude of \$2.83 for ease in calculating) of interest cost, debt amortization and preferred dividend requirements. Unlike our cash flow adjustment, the deduction is made even though the particular company has debt outstanding but is not required to make any payments in the current year. The reasoning behind this is that this procedure helps to segre-

PER SHARE STATISTICS	Continental Oil	Humble Oil	Ohio Oil	Skelly Oil
1954 Earnings	\$ 4.28	\$ 4.08	\$ 2.91	\$ 5.12
1955 Earnings	4.75	4.88	3.14	5.61
1954 Cash Flow	11.10	7.59	5.88	11.47
1955 Cash Flow	12.42	8.53	6.47	12.64
1954 Cash Flow (adjusted)	8.50	4.50	4.38	9.77
1955 Cash Flow (adjusted)	9.51	6.20	4.92	10.84
1954 Dividend	2.60	2.28	1.50	1.70
1955 Dividend	2.85	2.31	1.55	1.80
Book Value Per share	34.19	32.46	24.02	47.85
Crude Production (1955)(bbls)	5.3	4.0	2.7	4.3
Natural Gas Production MCF	13.0	10.4	7.1	21.0
Combined Production (bbls)	5.8	4.4	3.0	5.1
Oil Reserves (bbls)	81.7	83.7	50.7	78.3
Natural Gas Reserves MCF	256.0	446.2	160.8	435.1
Combined Reserves (bbls)	92.0	101.6	57.1	95.8
Refinery Throughput/share	4.1	2.6	1.2	3.0
Appraised Worth	\$ 112.00	\$ 118.00	\$ 71.00	\$119.00



SKELLY OIL CO.  
Appraised Value

	Millions
Reserves	
Crude, condensates & gas liquid - 450 million bbls @ \$1	\$ 450.0
Gas - 2.5 trillion cubic feet @ \$.04 per MCF	100.0
Undeveloped acreage - 4,259,730 acres @ \$5 per acre	21.3
Refining, marketing & transportation facilities @ 50% of cost	68.6
Investments & long term receivables @ net	4.0
Net current assets (12/31/55)	49.9
Total assets	\$ 693.8
Less Debt	8.7
Net appraised value	\$ 685.1
Appraised value per share	119.0
Market price per share	68.0
Market price as % of appraised value	57.0%

gate that part of a company's production which must pay for the maintenance and ultimate retirement of senior capital. Since the adjustment has been made on crude production, per share figures on natural gas production are easily obtained by dividing by the number of shares outstanding.

It will generally be found that the per share value of natural gas production is too small in itself to be of any significance. To ascertain the contribution which natural gas makes to values, it should be converted to barrels of crude oil. While there are a number of ways to do this (i.e., on a b.t.u. basis), the easiest method is to convert gas on a price basis. For example, with the average price of natural gas about 10c per MCF, 25MCF would be worth approximately the same amount as a barrel of crude. Thus, by taking natural gas production and dividing by 25, we can add the results to crude production and obtain a combined figure.

Oil reserves must also be adjusted. In effect, we are attempting to subtract that portion of reserves which will ultimately be required to pay off debt obligations not covered by the production adjustment. However, since net working capital can be applied to debt reduction, the adjustment need only take into account each dollar of debt in excess of net working capital. When obtaining this figure reserves should be reduced by one barrel for each dollar of debt. (Since future recoverable reserves have a value of approximately \$1, this amount is used rather than \$2.50.) After following this procedure when necessary, reserves per share of crude oil as well as natural gas may then be computed. To obtain the combined reserve figure, 25 MCF can again be converted into a barrel of oil (the 25 to 1 ratio holds, since the rule-of-thumb is to evaluate

in the ground reserves of oil at \$1 per barrel and gas at 4c per MCF). Rening throughout may also be computed on a per share basis.

Even though some spadework into annual reports is required, another valuable statistic which should be included under per share data is the "appraised worth" of each company. The above computation on Skelly Oil shows the general method used in arriving at this figure. It will be noted that reserves make the largest contribution to the total. By strict interpretation, the dollar amount applied to reserves should be determined by discounting future estimated income to its present worth. However, by using a price of \$1 per barrel of crude oil and 4c per MCF of natural gas (two readily accepted figures among petroleum analysts), a fairly accurate valuation is obtained without the extensive calculations required by more exacting methods. A decided advantage of using the appraised worth valuation is that it takes into account capital investments made in refining, marketing, transportation and other operations. Most important is the fact that it gives the analyst a sound basis for comparing the relative costs of all the assets of an oil company.

The investor's cost for earnings, cash flow, dividends, production, reserves and appraised worth are appropriate tests of the statistical values offered by individual issues. They are all figures easily analyzed and interpreted. For example, it will be noted that Continental Oil and Humble Oil sell at relatively high price-earnings ratios. Yet it should be noted that because Continental's accounting procedures are more conservative, it is much more reasonably priced on a cash flow basis. Investors looking for a relatively small investment cost for production and reserves, will find Ohio

VALUATION COMPARISONS	Continental Oil	Humble Oil	Ohio Oil	Skelly Oil
Price of common (11/21/56)	\$ 125	\$ 126	\$ 42	\$ 68
P/E Ratio	26.3	25.8	13.4	12.1
P/CF Ratio	10.1	14.8	6.5	5.4
P/CF (adjusted) Ratio	13.1	20.3	8.5	6.3
Cost per bbl. of Production	\$ 23.67	\$ 31.74	\$ 15.33	\$ 15.81
Cost per bbl. of Combined Prod.	\$ 21.55	\$ 28.77	\$ 13.91	\$ 13.22
Cost per bbl. of Oil Reserves	\$ 1.53	\$ 1.51	\$ 0.83	\$ 0.87
Cost per bbl. of Combined Res.	\$ 1.36	\$ 1.24	\$ 0.74	\$ 0.71
Mkt. Price % of Appraised Worth	112	107	59	57
Yield on Indicated Dividend (%)	2.4	1.9	3.8	2.7

Oil and Skelly Oil offer attractive values. On an over-all basis, Skelly appears to be statistically the more attractive.

If some concern has been felt concerning the large discrepancies in value, it should be noted that the "Oil Share Analyzer" makes no attempt to evaluate intangibles. Whether or not the particular intangibles will decide for Skelly Oil or any other company in the above group will depend upon the individual's own analysis of these factors.

**Listed** 1929—Midwest Stock Exchange  
(formerly Chicago)  
1937—New York Stock Exchange  
1949—San Francisco Stock Exchange

**No Bonded Indebtedness**

**Shares Outstanding 12/31/56**

Common Stock, 3,738,970 shares

4% Cumulative Preferred Stock, 90,974 shares

## ABBOTT LABORATORIES

Manufacturing Pharmaceutical Chemists since 1888  
NORTH CHICAGO, ILLINOIS

**Dividends paid** ★

1956 .180  
1955 .180  
1954 .185  
1953 .180  
1952 .195  
1951 .195  
1950 .185

◆ 1951—rights to buy preferred

1949 .180  
1948 .325

◆ 1949—2-for-1 stock split

1947 .240  
1946 .288  
1945 .220

◆ 1946—2-for-1 stock split and rights

1944 .220

◆ 1944—rights

1943 .200

1942 .190

1941 .215

1940 .215

1939 .205

◆ 1939—5% stock dividend and rights

1938 .170

1937 .210

◆ 1936—3-for-1 stock split

1936 .207

◆ 1935—33 1/3% stock dividend

1935 .245

1934 .250

1933 .200

1932 .212

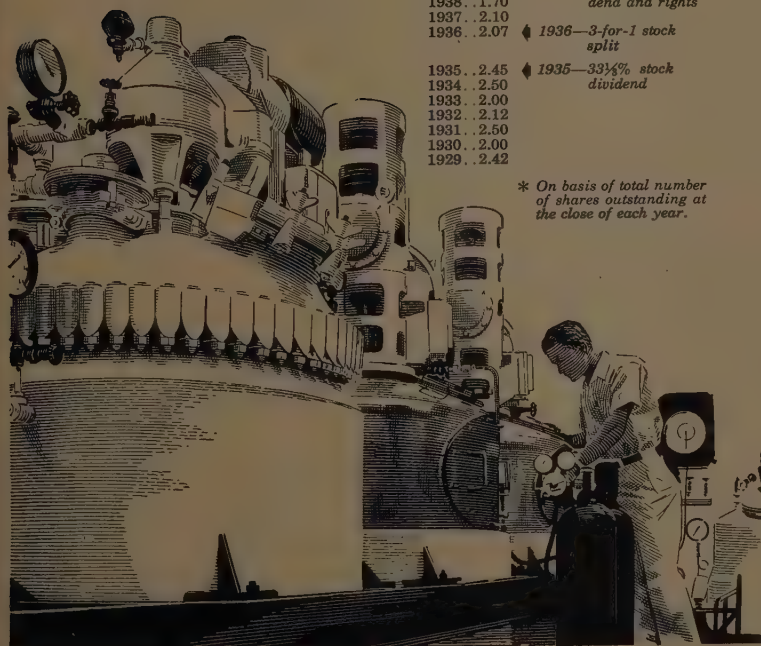
1931 .250

1930 .200

1929 .242

\* On basis of total number of shares outstanding at the close of each year.

*An unbroken record of dividends*



Once the "Oil Share Analyzer" has been set up, the analyst is rewarded with having a comprehensive picture of the statistical values offered by the industry. Moreover, it is a very quick form of reference. Because of this ease of interpretation, in fact, the "Analyzer" is an effective selling tool. In addition, it can be expanded annually to create an invaluable historical picture of the industry. For analysts and investors it is a tool of great usefulness.



**GENERAL  
PORTLAND  
CEMENT  
COMPANY**

**COMMON  
STOCK  
DIVIDEND**

The Board of Directors of General Portland Cement Company has this day declared a dividend upon its Common Stock of 45 cents per share with respect to the quarter ending December 31, 1956, and a further year-end dividend of 50 cents per share, both payable December 14, 1956 to stockholders of record at the close of business on November 30, 1956. The stock transfer books will remain open.

HOWARD MILLER,  
November 19, 1956 Treasurer

## Pullman Incorporated

**357th Dividend and  
90th Consecutive Year of  
Quarterly Cash Dividends**

A regular quarterly dividend of seventy-five cents (75¢) per share will be paid on December 14, 1956, to stockholders of record November 30, 1956. An extra dividend of one dollar (\$1.00) per share will be paid on January 7, 1957, to stockholders of record December 14, 1956.

CHAMP CARRY  
President







LAND USE • PUBLIC HEALTH • LAND RECLAMATION

CONSTRUCTION • TRANSPORTATION • EDUCATION



## MODERN SCHOOLS IN THE WASTELAND

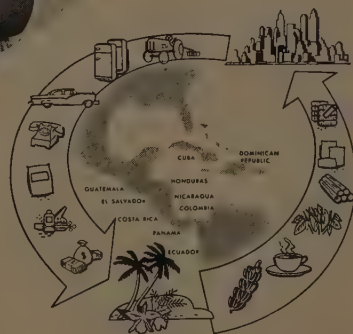
The jungle yields to the power of man armed with modern science and machinery. In the wasteland skilled men of Middle and North America are together creating banana plantations and thriving communities. Well-equipped, airy schools bring the full benefits of education to the children of the workers, molding the good citizens of tomorrow.

This practical guidance will fit these youngsters for the tasks ahead, operating farms, railroads and docks that their fathers carved from the jungle. They will inherit a strong economy, linking the rich lands of the Americas with the markets of the world. The crops of today bring the dollars, machines and manufactures to make that bright future a reality.

The Living Circle of trade and communication guards the prosperity of the Americas. This free way of life offers the only true security against communist aggression.

**United Fruit Company**

General Offices: 80 Federal Street, Boston 10, Mass.



### THIS LIVING CIRCLE STRENGTHENS THE AMERICAS

United Fruit Company has been serving the Americas usefully for 56 years—reclaiming wasteland, stamping out disease, developing human skills, helping by research, new techniques and transportation, to increase the production and sale of bananas, sugar and other crops, and expediting communications.

# Securities Market Levels Today and the Outlook for 1957

C. AUSTIN BARKER

**B**EFORE EXAMINING FUNDAMENTALS concerning the market outlook for the coming year it is essential to evaluate the relative position of the market today. Fortunately there are analytical tools which test the comparative level of today's bull market with other periods. This does not imply the past must be repeated, yet an understanding of history gives a perspective. There have been times when the stock market level itself took on an importance equal to the analysis of securities themselves.

Does a Dow-Jones industrial average such as last April's high of 521.05 (or the double top at August of 520.95) have real significance compared with the Dow-Jones peak of 381 in the 1929 bull market or the 194 points in the 1936-37 market? The 1946 market was a special post-war intermediate market that was brought to a quick close by the inability of the capital goods industry to contribute an important part because of reconversion problems.

The Dow-Jones average in itself doubtless reflects more of the changing value of the dollar than is warranted for proper comparison with 1929 and 1937. Standard & Poor's index of 50 leading industrials likewise has this limitation, yet a better view of growth from it may be had by looking at its long-term trend range. A chart of this range indicates that once again industrial stocks have broken out of their long-term upward trend band just as they did in 1929 and 1936-37. Historical statistics support an accepted fact, namely, the 1955-56 highs represent one of the three great bull markets of our century.

The common stock yields of the Standard & Poor's 50 industrial stocks express a more basic relationship than their prices. On this basis yields of 3.2% in 1929 and 3% in 1936 seem to put the October, 1956, yields of 3.96% in a rather conservative position. Even the 3.75% yield of the highest monthly average price of this index, i.e., July, 1956, does not seem to represent an outstanding bull market if one expects history to repeat its same patterns on a yield basis.

Many analysts examine fundamental statistics such as a comparison of high-grade common stock yields in relation to high-grade bond yields. There are tremendous institutional markets for such investments and constant and careful appraisals and reappraisals of alternative choices are made regularly. With the relative fixed quantity of stocks, their market price moves are largely induced by changes in demand rather than changes in supply. More than for most any commodity, the market for stocks is an expression of opinion, and in particular the marginal opinion as represented by the latest purchaser. For this reason, assuming no catastrophe that may create a desire for complete liquidity in cash, the ratio of stock yields to bond yields adopts an increasing importance as the yields tend toward equality because the bond yields become more attractive. When they are very close, small changes can bring about strong shifts in demand, some of which have occurred during the

past fourteen months. This creates a market highly vulnerable to price fluctuations. Today the average monthly yields (for October, 1956) of high-grade industrial stocks are about 1.1 times the high-grade bond yields. The ratios have trended downward rather steadily from the January-February, 1956, ratio of 1.4 times bond yields. This 1.1 ratio may be compared with industrial stock yields, which were about equal to bond yields in 1936-37, and industrial stock yields two-thirds the size of bond yields in 1929. This yield ratio is also an important tool for correcting our comparisons for long-term changes in interest rates.

Chart I shows the long-term trends in high grade operating utility bond and stock yields and government bond yields for a period covering two World Wars as a representative example of such trends, generally. It clearly shows the long-term upward trend in interest rates and bond yields since 1946 which followed a 13-year declining trend.

Although these bond rates probably will remain well above the levels of the decade of the forties (the days of easy money) they are unlikely to increase much more than today's levels before easing off. The great enigma is "what action will the Federal Reserve authorities take in 1957?"

The chart also shows that for the utility industry the ratio of common stock yields to utility bond yields is higher currently than for industrials (October 1956), with such stock yields at a level of 1.3 times bond yields. This compares with a ratio of 1.1 times utility bond yields in 1936. Thus the utility common stocks as an industry group appear to have a firmer position both cyclically and from an alternate choice standpoint versus bonds than do the industrial stocks.

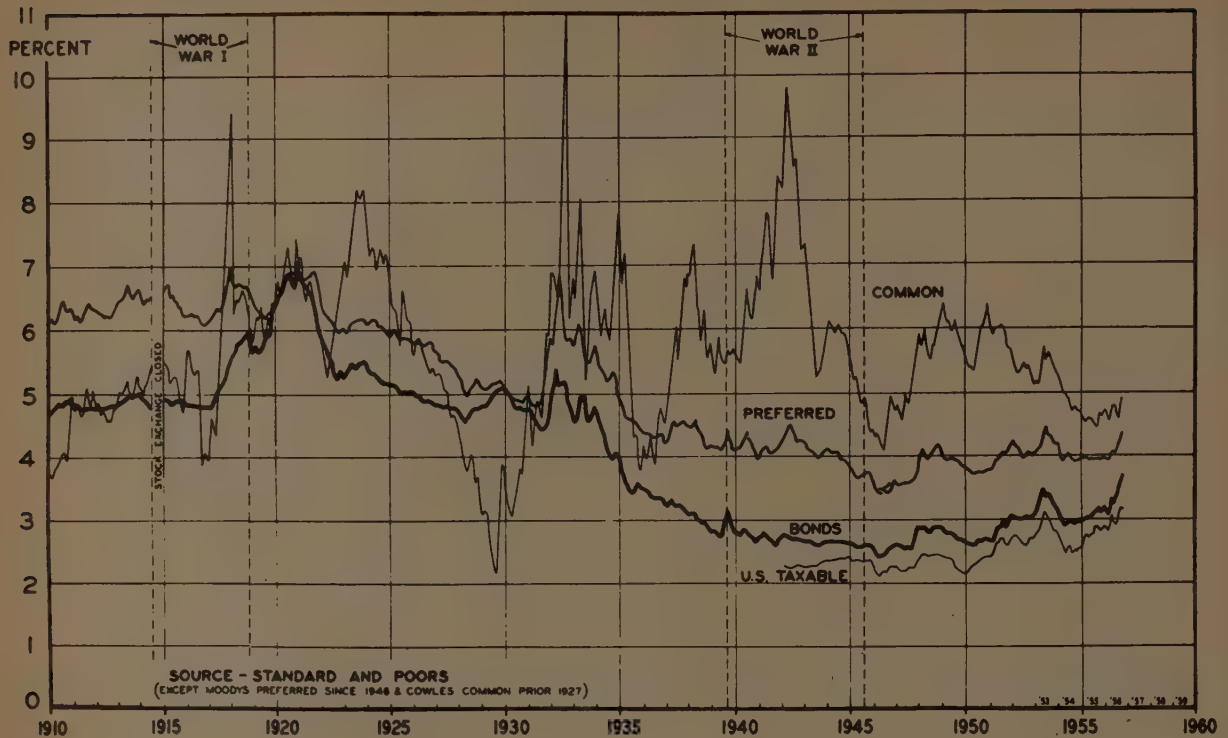
Another fundamental factor in appraising corresponding stock market levels is the average market price-times earnings per share of industrial stocks. The Standard & Poor's 50 high-grade industrials are selling currently at about 13 times earnings, which compares with prices of 18 to 20 times earnings in the 1929 and 1936-37 markets. This likening of old bull market highs should not be used as a goal to indicate further large market profit possibilities. In today's governmental and business environment it is not to be expected that such all-out speculation would occur nor that the tremendous drop in prices which followed the speculation of 1929 would be repeated.

Bull markets as we have known and defined them in the past must be reappraised under today's conditions. Direct and indirect controls and professional investment conservatism seem to have levelled off the past pattern peaks as measured by our statistical tools. The "550 Dow-Jones industrials" predictions for 1955 and the 600 point prediction for 1956 have faded away. This may be taken as a sign of health rather than weakness.

Similarly, on the downside, take notice of some of the estimates for Dow-Jones lows of below 400 in 1955-56. Fortunately, these, too, did not materialize. My own esti-



Chart I. Yields on High Grade Utility Securities & Government Bonds  
Years by Months



mate of a downside swing for late 1955 to a 425 Dow-Jones level was too low by 13 points as compared with the October 1955 Dow-Jones closing low of 438.

Another measure of bull markets is the ratio of Dow-Jones or Standard & Poor's industrial common stocks to their book values. In 1929, for example, the Standard & Poor's 50 industrials shares' peak market value reached a level of three times their average book value. In 1937 the index was 2.3 times the average book value at the peak. At the end of the first quarter in 1956 the ratio reached a peak of 2.4 and currently, at October, 1956, stands at 2.2 times book value.

If one assumes a long-term upward trend in price levels, the difficulty of appraising some relative replacement cost for the book value denominator makes this a difficult analytical tool to use either for market analysis or formula planning.

One of the widely used measures of peak timing for bull markets is based on the experience of past bull markets where the low-priced share stocks surged upward beyond the general market indices at the end of the bull market. The Standard & Poor's low-priced stocks index has not done this to date, being about 200 points below Standard & Poor's 50 industrials' index.

This failure is another indication of the difference between the present and past bull markets. This new behavior is due primarily to two factors: (1) Broader education of the millions of investors today, especially among the small

stockholders, cultivated by leading investment firms. This has culminated in the monthly investment plan of the New York Stock Exchange which has directed the attention of the small investor to a dollar cost averaging program in higher grade common stocks. (2) Margin requirements on stock market purchases which have prevented speculation on the down payment plan. As an example of this, the brokers' loan position is not an important credit problem today.

A low-priced shares' upward breakthrough is not a necessary last-stage indicator of a bull market top.

#### A MODIFIED CYCLE FOR COMMON STOCKS?

Many of today's comparative stock trend indicators seem to point to a more modified general market fluctuation in bull and bear markets in today's economic environment. Statistically this appears to be the case, but what of the qualitative aspects? What other factors are there that tend to support such market behavior?

Probably the most important factor is what is happening to the business cycle, not the stock market cycle. Stock price averages have substantial forecasting significance with respect to the business cycle, although their lead time as indicators varies rather widely from a short-term investor's standpoint. The longer-term view of the growingly important institutional investors, however, has a stabilizing influence here.

Part of the recent firming action which lessens the fluctuations of the traditional business cycle is due to what

President George Wilcox of Canadian Westinghouse<sup>1</sup> refers to as "people's capitalism", of which the significant idea is the recognition of employees as consumers. Payment of higher wages, the granting of more leisure time permitted by heavy investments for automation, and the more varied use of electric power to augment productivity have opened an enormous new output as well as supplying the increased consumer purchasing power necessary to activate that market.

Professor Sumner Slichter recently expressed this whole firming up action in economic terms before the New York Society of Security Analysts when he said, "The process of increasing productivity brings into existence large staffs of scientists and engineers; it increases the size of the capital goods industries which produce the equipment required by changing technology . . ."

Another important factor is the trend in larger government outlays for defense armaments and for public highways, other public works and civilian programs. The first three expenditures tend to support the capital goods industries and reduce wide business swings, which are thus growing less important in their impact on the ups and downs of the business cycle and also of the stock market cycle.

Growth in government spending is evidenced by a comparison of the disbursements in the 10 years prior to World War II and the 10 postwar years. Such spending averaged \$10 billion per year in the first period and \$56 billion per year postwar, or five times as much. This is a sizeable rise even after allowing for the higher price level of the latter period.

In the pre-war decade such government spending represented 13.5% of the Gross National Product, in the post-war decade it rose to 18.5%, which reflects the growing relative importance of this component. Even more significant is that Federal expenditures, which were only 30% of all government expenditures in the pre-war decade, now represent more than 60% of all such expenditures. The Federal component is more heavily weighted with expenditures of the capital goods type.

In an economy reflecting the above factors, the growing population, the desire for higher levels of living and the growing responsibilities of the United States as a world power all have their effect in stretching out business cycles. It also means a rising trend in price levels.

#### Bear Markets in Industrial Stocks<sup>(3)</sup>

	<u>Standard &amp; Poor's</u>		<u>Percentage Decline</u>
	<u>High</u>	<u>Low</u>	
1929 September	195.2		
1932 June		30.2	85%
1937 March	137.4		
1938 April		78.0	43%
1946 May	158.8		
1947 May		119.0	25%

Translated into the stock market cycle, this means a more stable behavior of the indices representing average stock market swings. Progress in this direction is evident from a recent review of cyclical downturns of major bull markets.

The upward swings are more difficult to compare, statistically, because of the longer duration and the factor of extreme differences in price inflation.

#### THE NEAR-TERM OUTLOOK

So much for the long-term behavioral pattern and the new look in stock market cycles. What of 1957? A more difficult question because we have not considered an ever-present force in the stock market cycle, the investor psychology. Even under a perfectly stable business level there would be stock market fluctuations by reason of this provocative factor. It may well be that the double top of April and August, 1956 (Dow-Jones) was the peak for the 1955-56 bull market (in the narrower swing meaning of a modified bull market). Yet, without major armed conflict, if the United States finds itself in a new arms spending race, there might be a rush to stocks as a hedge against inflation.

Institutional buyers probably would not go all out in buying stocks as a hedge against inflation, even in the event of increased government spending for defense armaments. First, a thin profit margin on defense contracts, and, second (in the event of a limited military operation) the threat of some kind of profits tax would be limiting factors in the evaluations of earnings and earnings multipliers.

Although common stocks are very tempting when the inflation outlook is strong, they are a protection against rising prices only when sound stocks are held over long periods of time. Within the long-term there are years when important limitations and divergencies occur. The table below compares the Bureau of Labor Statistics Consumers' Price Index and the price, earnings, and dividends of Moody's index of 125 industrial stocks from 1939 to date.

#### Price Level and the Stock Market

Year	ELS Consumers' Price Index 147-149=100	Moody's 125 Industrials		
		Price	Earnings	Dividends
1939	59.4	\$34.12	\$2.17	\$1.31
1940	59.9	31.76	2.59	1.67
1941	62.9	28.70	2.95	1.81
1942	69.7	25.70	2.36	1.64
1943	74.0	34.18	2.40	1.55
1944	75.2	36.57	2.73	1.67
1945	76.9	43.94	2.72	1.75
1946	83.4	49.84	3.53	1.85
1947	95.5	46.10	5.32	2.33
1948	102.8	47.50	7.03	2.78
1949	101.8	46.88	6.60	3.19
1950	102.8	57.83	8.45	3.77
1951	111.0	70.72	7.37	4.44
1952	113.5	75.63	7.18	4.20
1953	114.4	76.05	7.71	4.19
1954	114.8	95.81	8.38	4.46
1955	114.5	130.66	10.51	5.13

As shown above, Moody's industrials rose only 35% from 1939 to 1947 during a period in which consumers' prices rose 60%, yet earnings per share rose two and one-half times in the same period and dividends per share rose

1. *The Financial Post* (Toronto), November 17, 1956, p. 51.

3. *Semi-Monthly Review*, September 17, 1956, Paine, Webber, Jackson & Curtis, by Harry D. Comer. (Quoted in part.)



nearly 80%. Then, during the most stable recent period for consumer prices, 1953-55, stock prices made their greatest advance.

Discrepancies in the relationships of stock prices to purchasing value of the dollar are even greater in subgroups of industries and still greater for individual stocks. In the short-term period it takes unusual selective ability to find protection from inflation through the purchase of common stocks.

It is important in appraising the outlook for 1957 to note a new short-term factor which has appeared on the scene. Third quarter earnings are beginning to show some declines. Except for the steel strike and in the auto industry, they are not explainable in simple terms. Industry has operated at forced draft for two years, and it may well be that in spite of increasing government expenditures, we are beginning to lose some of the double-barrelled effect of the increase in the capital goods industries which is so important to a continuing bull market.

A comparison of the rate of change in the Standard & Poor's capital goods stocks' price index with the index of their 420 industrial stock prices since December, 1954, when the capital goods index broke upward through this general market index, shows a decline in "rate of gain" of the capital goods stocks over the market since the peak relative gain at July, 1955. This guide was described in

detail in a recent issue of Barron's<sup>4</sup>. There were partial recoveries (on a four-weeks moving average basis) at three points since that date, once in September, 1955, again in March and April, 1956, and finally in August-September, 1956. Although the capital goods prices have shown a more lasting strength than in previous bull markets, nevertheless the "rate of gain" trend over the market has lost more than half of its peak gain over the 420 industrials price index. An interesting parallel, although not a directly comparable factor, is seen in the declining trend of common stocks on the London Stock Exchange over the same period, since July, 1955.

Thus the earnings picture, coupled with increasing wages and prices and the increase in new productive facilities, should tend to make for stronger competitive forces at work between industries and between companies in 1957 than in 1956. This situation should provide a wide area now and in the next year or two in which the analyst must hunt with renewed interest for those industries and the particular companies within them which will be able to earn a sound rate of return on their total investment and, in addition, to reinvest a healthy portion of earnings at a rate of return comparable to that being earned on their existing plant. We may be approaching a period where the market for common stocks, as evidenced by the two leading indices,

4. Barron's, May 2, 1955, "Market Top?"

## NO NEED FOR SMOKE SIGNALS . . .

Pick up the phone and call us, or write! As fellow-analysts, we'll be glad to tell you about any of our client-companies:

American Maracaibo	Gregory Industries
American Metal Products	International Tel. & Tel.
American Steel Foundries	Mangel Stores
Armstrong Rubber	McGregor-Doniger
Brunswick-Balke-Collender	Metal & Thermit
Columbia Pictures	Mueller Brass
D W G Cigar	Ray-O-Vac
Detroit Steel	Robertshaw-Fulton
Drewrys Limited	Schick
Gardner-Denver	Thew Shovel
General Steel Castings	Universal Winding



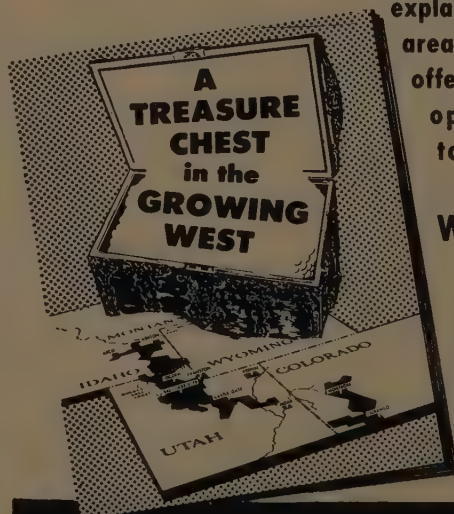
**Gartley &  
Associates, inc.**

68 William St., New York 5

Telephone: WHitehall 3-6770

## AREA RESOURCES BOOK

explains why the  
area we serve  
offers so much  
opportunity  
to industry.



Write for  
**FREE  
COPY**  
Box 899,  
Dept. G,  
Salt Lake  
City 10,  
Utah

**UTAH POWER  
& LIGHT CO.**

Serving in Utah - Idaho  
Colorado - Wyoming

i.e., the Dow-Jones Industrials and the Standard & Poor's Industrials, may be vulnerable to a drop of, say, only 15% or 20% in any downward fluctuation. However, certain industries might be hit more severely and thus would not warrant an investor remaining "locked in" by the 25% capital gains tax. This recognition should call for a great deal more selective switching between industries and companies within industries than we have heretofore seen if the investor is to preserve the maximum portion of his presently unrealized capital gains in our modern market.

This year has produced market letters with lists of high quality stocks selling at 20% to 25% below their 1955-56 highs. We have seen rotating strength in stock after stock and in different industries in the past year which illustrates how the momentum of markets carries on at top levels. Yet most economists and businessmen are of the opinion that high levels of business activity will extend through the rest of 1956 and well into 1957.

My feeling is that there will be no old-fashioned bear market in 1957. Nor will there be a resumption of the bull market. Rather, it appears likely that there will be a sensitive, highly selective market, subject to strong, short-term fluctuation with considerably more than the usual divergence in both directions among industries and individual stocks than in the market averages themselves.

Common stock of some industries, particularly of the heavy capital investment type, may show the effect of some duplication in the valuations placed on good management, higher earnings, and the ability to act as an inflation hedge. Stocks of these industries are not apt to continue at today's price levels unless the depreciation tax laws are revised to allow for some recoupment of capital due to higher cost plant and equipment.

#### FORCED PRICE INCREASE

In other industries the increases in raw materials, equipment and other components basic to their operation may force price increases in their product not warranted by the supply-demand position of their market. The threat of such a "squeeze" in profit margins may bring about investor reappraisal of the earnings multipliers even if the squeeze does not materialize.

Some industries such as oils find earnings outlook may be wholly different within the subgroups such as the outlook

for those groups with domestic and those with foreign crude oil production.

Conversely, in the next year or so, there is expectation of investment opportunities in common stocks of industries such as electronics, utilities, certain natural resources and rare metals, air conditioning, road building, and some chemicals, to mention just a few.

Neither should the high yields of many high grade bonds, preferred stocks and convertibles be overlooked where good income and safety are essential to the investor's needs. If we make the reasonable assumption that at the first sign of a general recession the Federal Reserve authorities would exercise one or more of their powers to ease money rates, there may be profit opportunities for fixed income securities, too, in 1957.

The forces shaping up behind today's securities markets make 1957 appear to be a year that will require more than the average number of decisions to be made by many investors. Yet it is also likely that dollar cost averaging will be more widely practiced by many investors. The year 1957 undoubtedly should be a year of great interest with uncertainties increasing toward its end. This is the type of climate that tests the financial analysts' abilities to the utmost.

#### THE LONGER-TERM OUTLOOK

Neither a severe recession or a new boom are likely. Without war or fringe war breakouts, the expected continuance of heavy government and defense spending should act as stabilizers to the extent that reasonable monetary controls can be exercised on the inflationary upside and sound fiscal and budgetary policies are continued by the present administration. Under these conditions, the renewed growth of population, the postwar emergence of the United States as a world power, and the continued evolution of technological changes fostered by long-range research and business planning should, over the next 10 to 20 years, confound the critics of the American system and lead us to new high levels of activity in commerce and industry. The tremendous need for vast sums of expansion money should provide new and fruitful opportunities for the investor who seeks income and appreciation through supplying the equity and creditor capital needs of our country's great industrial machine.

### ALLEGHENY LUDLUM STEEL CORPORATION

Pittsburgh, Penna.

At a meeting of the Board of Directors of Allegheny Ludlum Steel Corporation held today, November 15, 1956, a dividend of fifty cents (\$0.50) per share was declared on the Common Stock of the Corporation, payable December 20, 1956, to Common Stockholders of record at the close of business on December 7, 1956.

S. A. McCaskey, Jr.  
Secretary



### PACIFIC GAS and ELECTRIC CO.

#### DIVIDEND NOTICE

#### Common Stock Dividend No. 164

The Board of Directors on December 19, 1956, declared a cash dividend for the fourth quarter of the year of 60 cents per share upon the Company's common capital stock. This dividend will be paid by check on January 15, 1957, to common stockholders of record at the close of business on December 28, 1956.

K. C. CHRISTENSEN, Treasurer  
San Francisco, California

### The UNITED Corporation

The Board of Directors has declared a semi-annual dividend of 10 cents per share, plus an extra dividend of 15 cents per share on the COMMON STOCK, both payable December 14, 1956 to stockholders of record at the close of business November 26, 1956.

WM. M. HICKEY,  
President

November 14, 1956



# NOW

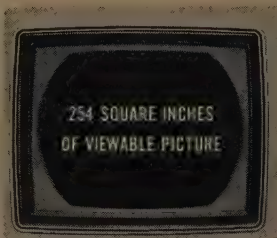
## is the time to buy color television

Color TV is here! It's right and it's ready. You can now see Color Every Night—and RCA Victor "Living Color" TV sets are now priced within the reach of every family! Here's the full story:



Like 2 sets in 1! You get Color and all black-and-white shows, too!

This is RCA Victor Compatible Color TV! You see all the great Color shows in "Living Color" . . . regular programs in clear, crisp black-and-white. With Big Color, you see *everything*.



All the colors of life—on a big-as-life 21-inch picture tube.

Actually 254 square inches of viewable picture area. And every inch a masterpiece of "Living Color." Here are the most natural tones you've ever seen—on a big-as-life screen!



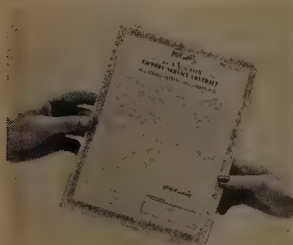
Color every night—right now! Something for everyone!

You'll have "two on the aisle" for the best shows ever—drama, comedies, Spectaculars, children's shows, local telecasts. For now 216 TV stations are equipped to telecast Color.



Big Color TV is so easy to tune, even a child can do it!

Turn two color knobs and there's your Big Color picture! It's easy, quick, accurate. You're in for a new thrill when the picture pops onto the screen in glowing "Living Color."



Practical and dependable! Service available at lowest cost ever!

Big Color is *dependable* Color. And RCA Factory Service is available in most areas (but only to RCA Victor owners) at *new low cost*. \$39.95 covers installation and service for 90 days.



Color TV is a common-sense investment—costs only a few cents a day.

It's sure to become the standard in home entertainment for years to come—yet you can enjoy Color every night *right now*! And you can buy on easy budget terms.



Now starts at \$495—no more than once paid for black-and-white.

This is the lowest price for Big Color TV in RCA Victor history! There are 10 stunning Big Color sets to choose from—table, console, luxurious lowboys, and consoles, too.



Make sure the Color TV you buy carries this symbol of quality.

RCA pioneered and developed Compatible Color television. Because of this unique experience, RCA Victor Big Color TV—like RCA Victor black-and-white—is First Choice in TV.

There will never be a better time than now to buy Big Color TV  
Be among the first to enjoy television's greatest advance in 20 years

Manufacturer's nationally advertised VHF list price subject to change.



**RADIO CORPORATION OF AMERICA**  
Electronics for Living

# Electronic Computers and Their Place in Securities Analyses

LAWRENCE ROSENFELD

**N**OWHERE ARE THERE so many facts, figures, and pieces of information as in the files and libraries of the research department of a brokerage house. These lie unused and neglected. Yet they are the basic working tools of our profession."

This comment sounded strange and paradoxical coming from a distinguished securities analyst of one of the largest brokerage houses in the world. His comment was the genesis of this article.

Surely, this man and members of his staff are aware of modern data processing machines which can store data in its electronic memories, accept new information, analyze the data and supply the results through high speed automatic printing mechanisms. He or members of his staff know that electronic computers can assimilate, process, evaluate, and retrieve information 100,000 times faster than humans.

Analysts will frequently judge the caliber of management and leadership directing a company's future by determining to what extent an executive is willing to adopt and utilize modern technological methods and equipment. It is another illustration of the proverb "the shoemaker's children go unshod." Securities analysts fail to apply to themselves the same criteria used to judge others.

Cognizant of this fact, several companies presented themselves the task of determining "where" and "how" electronic data processing computers could be utilized to augment security and market analysis. This problem has been studied extensively during the past year.

There are a number of ideally fertile areas wherein a computer installation can profitably and advantageously be put to work. Some of this work is routine and straightforward and the computer simply speeds up the process.

On the other hand, computer implementation is a new, imaginative and exciting technique whose limits are only demarcated by the imagination of the analyst and his confidence in the computer. The extent to which an analyst's ideas reach fruition will depend upon the ingenuity of his staff of computer specialists who must translate such ideas into coherent instructions for the computer.

## THE COMPUTER AS A SOURCE OF INFORMATION

A considerable effort by members of research staffs is devoted to answering inquiries concerning corporation statistics and allied information. These statistics include such items as dividends, earnings for the past several years, outstanding shares, the number of splits, gross annual sales, products manufactured, etc. The answers to these inquiries depended entirely upon a painstaking search of filed and catalogued information, an obvious task for memory cells of an electronic digital computer. Herein, the computer is a library or file of information which can be used to deliver information in minutes. To record this information on one of the largest and newest commercially available

computers would require approximately 3-4 million computer words, easily stored on magnetic tapes. The computer would require less than 10 seconds to search the file, locate a particular company, and print any or all of the information stored in the machine relative to the concern.

Remarkable as this feat is, it can be extended even more dramatically. Suppose the brokerage or investment house has a number of branch offices throughout the country and in Canada. Each office is electronically linked with the central computing facility. Inquiries for the computer originating from any of the branch offices are answered within 20 seconds. One might imagine an analyst 1000 miles away from the central computer requesting information about a company and within a minute after originating his request 800 printed words of information are laid on his desk.

To fully realize the advantage of a computer, we must couple the enormous fund of information stored within its components with its complimentary attribute—enormous arithmetical speed far surpassing men and the most modern mechanical contrivances.

Present-day high speed electronic computation allows a research group to tackle problems hitherto considered untouchable for reasons of economy and expedience. A computer can not only calculate, manipulate, and record information but it can do its task with a rapidity which astounds even the imagination. Integrated with guiding human rationale and ingenuity, the electronic computer is capable of analytic feats far beyond the accomplishments of a man or even large groups of men using conventional aids.

A few examples can best illustrate this speed. Both the well-known Dow-Jones averages and the Standard and Poor's 480 stock index can be derived in less than a second. All of Standard and Poor's group averages can be computed in less than 2 seconds.

## RELATIONSHIPS DETERMINED

Frequently a securities analyst will attempt to determine relationships among sets of variables or factors. In a broad sense, the securities analyst seeks in many instances cause and effect relationships. Herein, he must utilize the various techniques of correlation and regression theory—a measure of how strongly a pair or set of variables are related. Certain variables may be completely independent, weakly dependent, or strongly dependent on others. In seeking to work out these relationships the analyst can be confronted with solving a system of simultaneous linear equations with as many as 50 unknowns. To solve this system by conventional methods, i.e. using desk calculators, would take as a minimum 6-9 man months of effort. Even then, there would be no check as to the accuracy of the answers. On a digital computer, this system of equations can be solved and the answers verified in less than 2 minutes.

A computer specialist would classify as routine or



straightforward the areas of computer implementation discussed so far, but there are more and spectacular uses. The task of "monitoring" the ticker tape is one such use.

"Monitoring" includes such complex functions as maintaining "up-to-the-minute" files of every stock listed on the largest exchanges. This file would include such items as the price of the last transaction, the day's high and low up to that time, the volume of shares traded up to the last transaction for each issue, the frequency of transactions for each issue, and any other items of possible significance. Data for deriving information can be fed directly from the ticker tape into the computer for processing, and up-dating the file. This assignment would require only 10 percent of the available computer time between opening and closing of the day's business. What about the remaining 90%? Is it just free or idle time? By no means! !

Additional utilization of this free or idle time can be accomplished in several ways. For example, the market has a group of traders known as "tape watchers." They believe that the tape or market speaks for itself. They constantly observe the tape for certain sign posts, an increased activity in a stock which has over the past few months (or even years) been inactive. Or it might include the selling of large blocks, or a run on a stock, etc. The computer can be programmed to see these sign posts and indeed as many other sign posts as one can logically and definitively enumerate. It can then inform the trader analyst when they occur.

The computer with its additional free time can calculate up-to-the-minute running averages of various groups and can analyze individual stock's movement within the group and determine whether or not they agree. There is no idle or free time—if the analyst wishes it so.

#### TECHNICAL ANALYSIS OF INDIVIDUAL STOCKS

Another annual application of the computer's versatility is its use in the derivation of daily technical analyses of individual stocks listed on the various large exchanges. An examination of price and volume patterns of each stock to determine the presence of the classical technical (or "Chartist") reversal patterns, consolidation formations and trendlines. Possible representative reversal or consolidation formations which can be considered include "ascending and descending triangles," "head and shoulders," "top and bottom," "pennants," gaps, and "island" reversals. The computer can analyze each individual stock issue for the presence of any of these formations at the end of each market day. Within two hours a large scale computer can examine the more than 2000 issues listed on both the New York and American Exchange over a period of 60 through 90 days' transactions to determine the presence of any of the 20 major "Chartist" patterns and point out those issues whose behavior is currently in accordance to the chartist criteria.

No reference in the literature of market analysis has indicated whether the chartist's theories have ever been tested on a sample large enough to definitely establish the validity of the theory. The computer can be used to achieve this goal. How? —by replaying sufficient history of all the stocks to determine how frequently a chart of a stock displayed a typical formation and how frequently its future

behavior acted in accordance with its predicted behavior. How many months or years of previous history will be required to obtain a large enough sample to make statistical inferences will have to be determined as part of the research project.

#### A POWERFUL TOOL IN SECURITIES RESEARCH

It is obvious from what has been said that cogent utilization can be made of the computer. It can become a powerful and versatile tool in securities and market research. Crude approximations are no longer necessary in analyzing the validity of conjectured theories. And as the analysts begin to acquire a familiarity with the capability and capacities of an electronic computer, they themselves will suggest other fruitful areas wherein computer usage can be of assistance in helping them to sounder decisions.

Although the staff is not part of a computing installation it is an essential supplement to it. The nature and size of the staff varies in accordance with the nature and volume of work being performed. It also varies considerably with the size of the computing installation.

The costs of acquiring and maintaining a competent staff are appreciable. However, it should be emphasized that people of the greatest possible competence should be obtained for such a staff. The ultimate output of the machine will be extremely sensitive to the caliber of this staff. For a small installation doing a small variety of problems the annual staffing costs can be as low as \$30,000. For large installations handling a wide variety of problems the annual staffing costs can run as high as \$500,000.

#### THE COMPUTING STAFF

A computing staff usually consists of two groups of specialists. One group is the senior and mathematically mature analysts. They must understand the problems and derive a solution which is suitable for computer implementation. The mathematical analyst has to comprehend the nature and scope of the problem and having satisfactorily done so must consider and evaluate the various methods available for solution. His evaluation must be made with a keen awareness of the capabilities and limitations of the computer which is used. He relies to a large extent only on his ingenuity, his mathematical maturity and his experience of work with, and knowledge of, the computer. He bridges the gap between the person who formulates the problem and the programmer who must plan and write the strategy which the computer must follow to work out a solution.

Programmers, the second group of specialists who go to make up a computing staff, implement the ideas and instructions of the analysts so that the latter's solution can be successfully worked out by the computer. Their task is essentially that of logically planning step by step the operations which the machine must perform to work out a solution. They thoroughly understand the organization and operation of the computer. A good programmer is resourceful and constantly devising new methods and schemes for getting the most out of the computer.

A top programming staff recently completed the first phase of a project to "monitor" the New York Stock Ex-

change ticker tape at their computing facility in Boston. This initial phase included the writing of a computer program which enables the machine to compute an "up-to-the-last-transaction" weighted average and index of approximately 500 stocks. Moreover almost 80 group averages will be maintained on an "up-to-the-last-transaction" basis. In addition, volumes of sales and the number of sales of each of the 500 stocks will be calculated on a continuous basis. The programmers had little difficulty writing the instructions which enable the computer to perform these relatively trivial computations. Far more difficult was the programming of the computer to translate the ticker tape. This translation includes recognizing and distinguishing corporate abbreviations from letters which are parts or all of words or other abbreviations.

THE COST OF INSTALLATION

The economics of computer usage is equally as important as the areas of computer application. Since our chief concern was the uses peculiar to the securities field, we have not made mention of the more obvious areas of computer-usage. This includes payroll, billing, invoicing, and accounting operations. These areas should be considered in evaluating whether or not a computing installation would pay for itself. A computing installation is costly. It can cost as little as \$100,000 or as much as \$3,000,000 without its staff of

specialists. The costs of computers are almost totally related to their speed of operations and to their storage capacities. The larger and faster commercially available computers of today can perform up to 20,000 arithmetic operations per second and store more than several hundred million pieces of information in its electronic memory.

The costs of getting to use a computer (system analysis and problem preparation) must also be taken into account. These costs can run as high as several hundreds of thousands of dollars, depending to a large extent on the amount of work scheduled for the computer.

In the last analysis whether a computer pays its own way depends on a number of factors. What standard every day operations can be replaced by the use of a computer? What new areas of research and investigation can be attempted through the use of the computer? What new services can the company give to its clients because it acquires a computer? These and other questions when fully answered write the price tag. But this price tag alone will not justify the purchase or rental of a computing system. In many cases answers will have to be based on subjective and intuitive reasons; can one place a dollar value on the publicity and prestige ascribed to a company who conducts its research and studies by electronic computation and delivers accurate up-to-the-minute answers to its clients.

Newport News Shipbuilding and Dry Dock Company

Quarterly Statement of Billings, Estimated Unbilled Balance  
of Major Contracts and Number of Employees

(Subject to audit adjustments)

Billings during the period:	Three Fiscal Months Ended		Year Ended	
	Dec. 31, 1956	Dec. 31, 1955	Dec. 31, 1956	Dec. 31, 1955
Shipbuilding contracts . . . . .	\$27,693,958	\$19,993,980	\$ 81,747,157	\$ 86,717,925
Ship conversions and repairs . . . .	10,578,822	6,710,974	24,885,560	16,394,622
Hydraulic turbines and accessories . .	430,604	986,700	2,888,359	7,499,680
Other work and operations . . . . .	2,448,859	3,635,081	10,048,116	14,012,894
Totals . . . . .	<u>\$41,152,243</u>	<u>\$31,326,735</u>	<u>\$119,569,192</u>	<u>\$124,625,121</u>
Estimated balance of major contracts unbilled at the close of the period . . .	At Dec. 31, 1956 \$371,735,676		At Dec. 31, 1955 \$148,028,501	
Equivalent number of employees, on a 40-hour basis, working during the last full work-week of the period . . . . .	12,020		9,542	

The Company reports income from long-term shipbuilding contracts on the percentage-of-completion basis; such income for any period will therefore vary from the billings on the contracts. Contract billings and estimated unbilled balances are subject to possible adjustments resulting from statutory and contractual provisions.

By Order of the Board of Directors  
R. I. FLETCHER, Financial Vice President

January 23, 1957





## ***Just a little help can keep things going***

In these days of high employment and general economic good health, the threat to a family budget is not so much a complete breakdown as momentary stalling. When this happens perhaps all that is needed is a small loan to keep things going.

The Beneficial Finance System makes such loans available. Beneficial has more loan offices in number and spread over a wider territory than any similar organization. During 1956 Beneficial made loans amounting to nearly Three Quarters of a Billion Dollars.



*"... a BENEFICIAL loan is for a beneficial purpose."*

# ***Beneficial Finance Co.***

Beneficial Building, Wilmington, Del.

**MORE THAN 1000 OFFICES IN THE UNITED STATES, CANADA, HAWAII AND ALASKA**

# A "Character of the Market" Method Is Facing a Crucial Test

MARC DE GOUMOIS

THERE ARE, OF COURSE, many approaches to the fascinating game, or serious task, of trying to forecast the probable trend of the stock market by technical means. Of all the various approaches, those which seek to analyze the "character of the market" are probably among the ones most likely to give good results, provided the factors they are trying to evaluate are both significant and logical.

One of these "character of the market" methods which has given, thus far, anyway, a pretty good account of itself and is, incidentally, about to face a crucial test, is based upon the study of the behavior of the stocks, or groups of stocks, which are the acknowledged market leaders. By leaders is meant those important stocks or groups which show the greatest percentage gains at the successive phases of a bull market, and, reversely, those showing the greatest percentage losses at the various stages of a bear market.

## BULL MARKETS

Speaking now only of bull markets, the general assumption on which this method is based is that the stocks or industry groups which are the market leaders because they have gained the most during the past phases of a bull market should go on acting better than the other stocks or industry groups. Once they begin to falter and show a consistent and extensive failure to maintain their greater forward momentum, this is a pretty good sign that the major trend of the stock market has changed or is changing.

The psychological considerations behind this assumption are:

All listed stocks are constantly investigated, appraised and compared by professional investment analysts and by experienced investors. As a result of this unceasing work, those stocks or groups of stocks which have risen the most during a bull market will, sooner or later, begin to look less attractive marketwise than stocks or groups of stocks which have moved up in a more restrained manner. The net result of this constant appraisal and re-appraisal will be a gradual increase in switches away from most of these leading stocks or groups of stocks. Their forward momentum will thus be reduced and, as the market moves up toward a climax, it may be replaced by an actual lag which can be measured.

This is a natural process which has been observed during every bull market since 1918 and it should be even more pronounced now than before on account of the great increase in stock holdings under constant professional supervision.

## BEAR MARKETS

Speaking now of bear markets, a reverse process takes place during them. There comes a time, after an extensive decline, when the stocks or industry groups which have de-

preciated the most begin to look attractive to the bargain hunters and alert investors and they are being bought in preference to those with less extensive declines. Their previous greater downward momentum is thus slowed down, and they will even begin to act better, marketwise, than the other stocks or industry groups.

Once the soundness and logic of this general assumption and of its psychological background had been demonstrated by numerous samplings, a research program — spanning many years — was undertaken. Its fundamental idea was: if the constant behavior of leading stocks and industry groups is as indicated by these samplings, this should have a definite forecasting value . . . and there was also the very tempting possibility of making the entire method completely automatic and free from human judgment.

Without going through an enumeration of all the false leads which were followed temporarily and of the gradual improvements which have been progressively added to the original concept, here are some of the principal aspects of this automatic method. It was completely "mise au point" some years ago.

### 1.—Using Industry Groups Instead of Individual Stocks:

The value of a technical method is greatly enhanced if (a) it covers a great number of important stocks, (b) it is free from distortions due to split-ups and large stock dividends, and (c) its background can be reconstructed for many decades.

The only practical way to cover these three desiderata was to use the data on industry groups—each group consisting of all the important stocks in a given industry—published by a nationally known statistical organization such as Standard & Poor's Corporation. Its statistical information on industry groups goes back to 1918, its groups include practically all the leading common stocks listed on the New York Stock Exchange, and the method of computation affords adequate protection against stock splits and individuals.

### 2.—Using a Three-Way Instead of a Two-Way Ratio:

The use of a simple two-way ratio or the computing of the action of a speculative group in ratio to an investment group, or of a high-velocity group in ratio to a low-velocity group, has seldom been found to be satisfactory. One of the reasons for this is that the resulting measurement or index is often too "jerky" and is, consequently, quite unreliable.

One way to try to avoid this jerkiness is to use a running average, but the chief trouble with this variation is that it not only reflects in a smaller way the situation as of a given day, but it gives greater emphasis to the previous time elements.



Another way, and probably the best way, to guard against these jerky movements and to have, at the same time, an index which will reflect only the present situation, is to introduce a third group in the computation. It can be either a semi-speculative or a medium velocity one. This third group will act like a balance wheel between the two extreme groups and it will tend to smooth out their wider fluctuations without introducing retroactive time factors.

Three-way ratios are best computed by trigonometrical means . . . more on this under the subtitle "Deviation Index," further along in this paper.

### 3.—*Letting the Industry Groups Classify Themselves:*

When this three-way method was first conceived way back in 1937, it was based upon a fairly large number of common stocks arbitrarily classified as: investment type, semi-speculative type, and speculative type. This worked out very well for quite a while, and it is remembered that this method gave a sell signal in March 1937, a buy signal on March 31, 1938, and it turned very bearish in October or November 1940. But it seemed, by 1944 or 1945, to cease to be responsive to stock market swings and its index became almost a straight line.

It was finally ascertained that the cause of this index getting "stale" was due to the quality classification having remained unchanged for many years. There was, for instance, United States Rubber, classified as speculative in the '30's, which had become at least semi-speculative by 1944, and there was a new flock of speculative stocks—air transport, radio, etc.—which were not included in the original list.

Selecting new stocks and re-arranging the old ones according to their new ratings would have meant using judgment and it would have also left the entire system open to another possibility of getting "stale" at some later date.

The only way to avoid these two pitfalls was to select representative industry groups and to let them classify themselves as to leadership or velocity. The new criterion was, and is still, the maximum percentage changes from typical lows or highs, as the case may be.

For this purpose, the thirty most important industry groups in Standard & Poor's classification are arranged into three velocity aggregates—each consisting of ten industry groups—according to each group's maximum percentage gain or loss, as the case may be, from its previous bear market low or its previous bull market high. Only one substitution has been made throughout the past history of this method: when Standard & Poor's added an Aluminum group to their list, it was used to replace the Theatres & Motion Pictures group, which had been in the 30-group tabulation since 1920.

The ten industry groups showing, as of a given time, the greatest maximum percentage changes are bunched together and they form what is called the High Velocity Aggregate. The next ten groups form the Medium Velocity Aggregate, and the ten groups showing the smallest maximum percentage changes form the Low Velocity Aggregate.

As of September 12, 1956, these three velocity aggregates consisted of the following industry groups. (The percentage figure alongside each group represents its highest level subsequent to and in ratio to its low of 1940/1942):

#### *High Velocity Aggregate:*

Paper	3145%
Tires & Rubber	2743
Aluminum	2275
Office Equipment	1603
Radio, TV, Electronics	1457
Aircraft Manufacturers	1245
Air Transport	1225
Oil Composite	1090
Automobiles	995
Building Materials	923

#### *Medium Velocity Aggregate:*

Steel	890%
Metal Fabricating	880
Electrical Equipment	738
Chemicals	734
Investment Companies	700
Machinery: Composite	675
Textiles: Composite	607
Auto Parts	583
Railroads	561
Copper	548

#### *Low Velocity Aggregate:*

Retail Stores	535%
Mining & Smelting	523
Drugs	361
Utilities: Operating	349
Food Composite	348
Agricultural Equipment	346
RR. Equipment	302
Sugar: Composite	269
Tobacco: Cigarette	233
Utilities: Tel. & Tel.	191

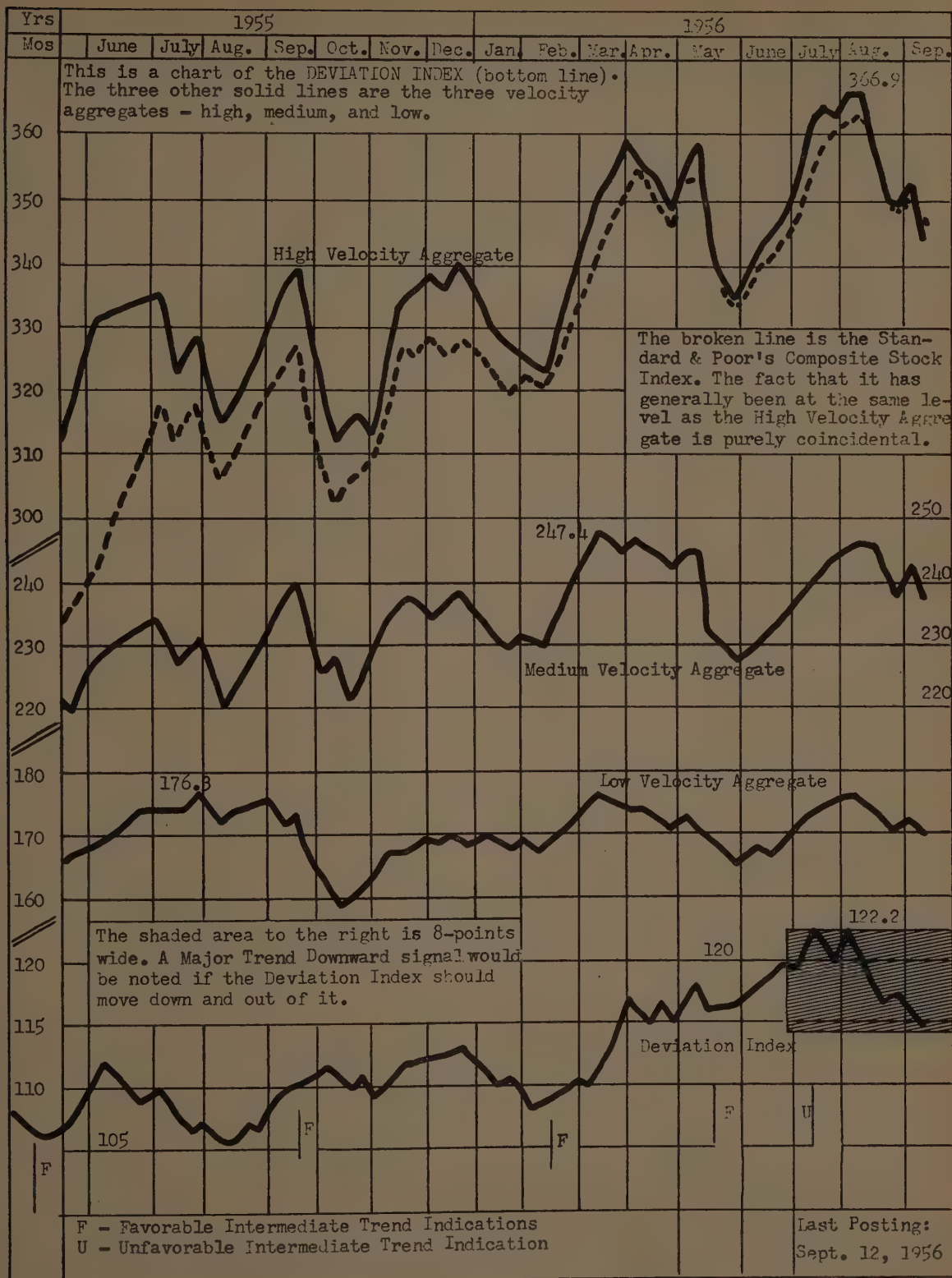
This classification is always fluid because it is immediately revised whenever a faster moving industry group overtakes one which has failed to keep pace with the rest of its class or which has failed to make new highs for some time. There is, for instance, the case of the Textile Composite group, which has not made a new high since 1951. It was then high velocity and it is now medium velocity. Other groups have been similarly displaced.

Because of this constant reshuffling, the thirty industries reflect immediately any change in the economic and price patterns of the stock market. There is no risk of getting wrong signals due to a stale or unrealistic velocity classification.

### 4.—*The Deviation Index:*

An index based upon a very old trigonometrical principle is used to compute the result of the three-way interplay and relationship among the three velocity aggregates. It is a very logical one and it has given accurate measurements of this three-way ratio.

The gist of this method is: when the three velocity aggregates (high, medium, and low) move up or down at the same rate, the resulting trigonometrical measurement will remain substantially unchanged. But if the High Velocity Aggregate should move up—as it normally does during a bull market—at a faster rate than either of the two other aggregates, then this trigonometrical measurement—which is called the Deviation Index—will move up too. On the other





hand, if the High Velocity Aggregate should remain unchanged while the two other aggregates are moving up, or if it should move down while the others are either moving up or remaining unchanged, then the Deviation Index will move downward. This index will also have a normal tendency to move downward during a bear market because the ten industry groups then in the High Velocity Aggregate are there on account of their having lost proportionally more ground than the other groups.

To put it in general terms: whenever there is a *deviation* from proportionate price movements among the three aggregates, the Deviation Index will indicate and measure this deviation.

Deviations are of various extents, but it has been found, on the basis of reconstructed patterns going back to 1918, that when deviations constitute a trend reversal amounting to eight points—in terms of the Deviation Index—this is a pretty reliable indication that the major trend of the market has also changed.

On the basis of this long series of observations, the following two simple automatic signals are used in connection with major stock market trends:

1. The major stock market trend is *downward* when the Deviation Index has lost more than eight points from the highest level it had reached subsequent to the occurrence of a major uptrend signal, and

2. The major trend of the stock market is *upward* when the Deviation Index has gained more than eight points from the lowest level it had touched subsequent to the occurrence of a major downtrend signal.

These two automatic signals—which are never subject to interpretation—would have given the following results if they had been used to buy and sell stocks valued in terms of the Dow-Jones Industrials Average:

Buy Signals	D-J Ind.	Sell Signals	D-J Ind.	Subsequent Lows
May 31, 1922	95.63	Feb. 4, 1920	97.23	63.90
Sept. 16, 1926	158.71	Mar. 19, 1926	145.11	135.20
Apr. 30, 1930	285.77	Oct. 10, 1929	352.86	198.69
Aug. 10, 1932	69.39	Mar. 7, 1930	263.69	41.22
Apr. 19, 1933	68.31	Nov. 23, 1932	59.47	50.16
July 28, 1938	142.20	Apr. 28, 1937	170.13	98.95
Sept. 6, 1939	148.04	Apr. 5, 1939	130.24	121.44
May 29, 1941	116.23	Jan. 30, 1940	152.80	111.84
Jan. 11, 1950	201.61	June 26, 1946	202.10	161.60
May 19, 1954	326.09	Feb. 4, 1953	289.08	255.49

If the number of D-J Ind. points gained to date (Sept. 12, 1956—D-J Ind. 499.97) from the last buy signal of May 19, 1954, were added to the gains from the above tabulation, the results from February 4, 1920, to September 12, 1956, would be:

Total of Dow-Jones Ind. points gained:	1123.41
Total of Dow-Jones Ind. points lost:	121.21
Net gain:	1002.20

A further analysis of this tabulation brings out the following facts:

1. Most of the sell signals have occurred soon after and very near the preceding stock market tops,

2. The maximum declines after the appearance of a sell signal have generally been substantial, and

3. Some of the buy signals have been slow in making their automatic appearance. This is especially true of those after the stock market bottoms of June 1949 and September 1953. The apparent reasons for these delays are: (a) the previous declines had not been of full bear market proportions, and (b) the buying which took place at or soon after these bottoms was of an extremely cautious nature and it was centered mostly in the normally slow moving groups.

It was noted, however, in connection with the last of the above remarks (No. 3) that the Deviation Index had established an unmistakable uptrend between January 1948 and June 1949, and also between June and September 1953. These uptrends by the Deviation Index were against continuing downtrends by the stock market. Although they then measured less than eight points, they were, nevertheless, very favorable indications. These uptrends indicated that the industry groups in the High Velocity Aggregate were resisting the general downtrend to an appreciable extent. Some preliminary buying was advisable on the strength of such favorable formations.

Another interesting feature of the Deviation Index is the meaning of some of its shorter swings when they are strongly against the prevailing trend of the stock market. A typical occurrence of this nature was noted during the severe intermediate reaction of the stock market during the fall of 1955, when the Dow-Jones Industrials Average lost 48 points, or 10%, in three weeks. Not only did the Deviation Index refuse to move downward—as it was normally expected—but it actually moved upward during the worst of this break.

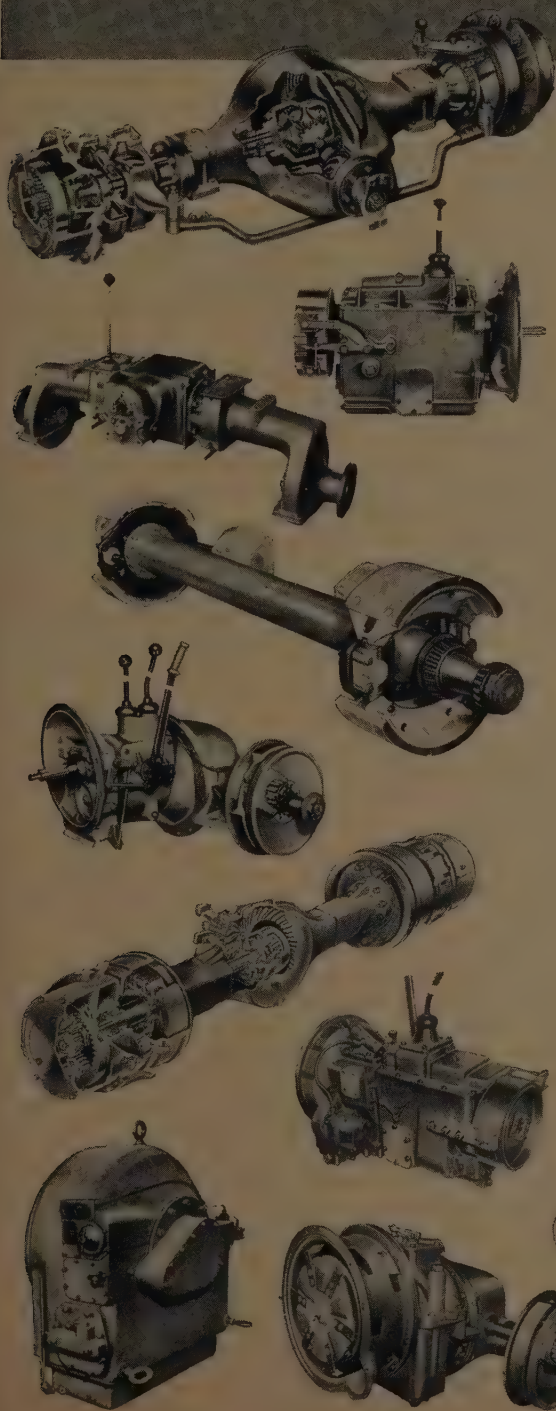
Similar favorable intermediate trend indications were also given by the Deviation Index on several other occasions. The last four are indicated by (F) on the accompanying chart. Among the unfavorable intermediate trend indications—the index moving downward against a stock market upswing—one was noted one week before the recent top of early August 1956.

Coming back to the major trend of the stock market—which is what the Deviation Index is primarily supposed to indicate—the action of this index since its last buy signal has been normal for a bull market, with all reactions, except the last one, well within the eight-point limit mentioned.

This last reaction began after the second of the index's double tops of July 11 and August 4, 1956, and it has now reached almost eight points. This rather substantial drop could indicate that, after having shown remarkable resiliency during the previous intermediate reactions of this bull market, the industry groups in the High Velocity Aggregates have suddenly ceased to maintain an over-all favorable market action.

Whether this is a temporary situation—soon to be remedied—or an indication that the major trend of the stock market is changing, should be decided within a week or two. The Deviation Index must either rally strongly or move down and out of the shaded area of the chart, which is eight points wide. This would be a Major Trend Downward signal.

# From fly-wheel to drive-wheel ... let it be CLARK



There's no finer assurance of a long and profitable life for a revenue vehicle than Clark units delivering horsepower from fly-wheel to tires. That basic usefulness extends with equal effectiveness to stationary power plants.

It's a distinguished family of proved money-makers—every one a product of planned specialization in this vital area of power transmission; every one solidly proved by millions of low-cost miles.

Today, as for more than a half-century, it's good business to do business with

**CLARK®  
EQUIPMENT**

**CLARK EQUIPMENT COMPANY**  
BUCHANAN 5, MICHIGAN

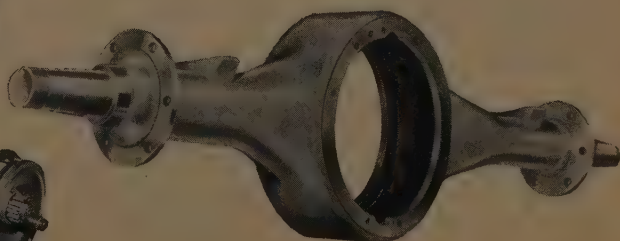






Photo by Lockheed Aircraft Corporation

## this arctic warrior lost weight in Texas

Blasting rockets help get this Navy heavyweight off the ground and on its way to polar service. Almost two tons of its load is electronic equipment (much of it built by Texas Instruments). This electronic bulk is *essential*, yet every pound displaces a pound of vital fuel or armament.

To trim weight but not effectiveness, the Department of Defense and Lockheed joined forces with Texas Instruments — major producer of military apparatus and largest producer of transistors...tiny devices that make possible today's pocket-size radios. By transistorizing the

airplane's intercommunications network, for example, almost 100 pounds were saved...and space and power requirements of the system were sharply reduced while service life and reliability were greatly improved.

This military project — one of the many under way at Texas Instruments — is typical of TI's progress for more than a quarter century...in geophysical exploration methods and instrumentation...in complex electronic systems and components...and in mass-production of silicon and germanium semiconductor devices.

keep an eye on T/I



**TEXAS INSTRUMENTS**  
INCORPORATED

6000 LEMMON AVENUE DALLAS 9, TEXAS

## AIRCRAFT AND GUIDED MISSILES

### Regulus I

SAM O. PERRY

*Junior Assistant Engineer, Chance Vought Aircraft, Inc.*

**T**HE REGULUS I MISSILE, currently being produced at Chance Vought Aircraft for the United States Navy, is a surface to surface bombardment missile developed specifically for employment from Naval vessels. Its mission is to attack important shore targets with a high yield warhead from ships located at sea. This Naval application is the major unique feature of the REGULUS weapon system. REGULUS was the first missile, of its size and complexity, to be developed for and employed successfully from many types of Navy war ships.

The power plant is a conventional turbojet engine—the Allison J-33 which has been used in many military aircraft. REGULUS is launched from a short (8 foot) straight rail launcher elevated 25 from the horizontal. Two 33,000 pound thrust, solid propellant, rocket motors provide launching boost. In the 2.2 seconds that these motors burn, REGULUS is boosted to flying speed where the jet engine takes over and the expended rockets are jettisoned.

REGULUS was originally designed and developed as a submarine weapon. It is currently carried on the submarine in a large hangar or can located on the after deck. Existing fleet boats were converted to provide this installation. New construction submarines designed specifically as SSG's or guided missile carriers are now under construction.

The development of REGULUS I was initiated in 1947 by the Navy's Bureau of Aeronautics to an operational requirement established by the Chief of Naval Operations. Throughout these nine years of development, Chance Vought has been exposed to every facet of the evolution from initial design through full production and deployment into service use.

Chance Vought found that, by and large, the straight design, tooling and manufacture of a missile could be accomplished within the parent organization without requiring any major reconfiguration. Organizational changes generally have taken the form of supplementing an existing structure with added functions requiring special attention peculiar to missile development. Briefly, some of these direct functions that had to be supplemented or added were as follows:

Electronic computers were procured and manned to perform the more precise analyses required to design an automatically controlled vehicle.

A reliability engineering staff group supplemented by a

laboratory for reliability testing was formed to assist in designing to higher standards of reliability and to maintain a continuous monitor on the state of the missile's reliability.

Chance Vought chose not to manufacture major electronic systems for the missile, but rather, subcontracted these items with qualified vendors. However, it was necessary to form a sizeable electronics design section for technical administration of these subcontracts and to accomplish the systems engineering of tying the systems together and to the missile.

A special design section was added to handle the proportionately more support equipment involved in a missile system.

The Quality Control Department was considerably strengthened and graduate engineers were assigned to some of the more complex inspection functions. IBM systems for follow up on every discrepancy and malfunction were instituted.

A sizeable field group was formed to conduct the contractor's flight testing which had to be done at a government missile test facility. The group is practically self-sufficient with engineers, technicians, mechanics, pilots, and data analysts; and has been on assignment on a permanent basis for almost six years. For plant acceptance of missiles, special facilities were built and staffed to provide for final checks and ground running of completed missiles. Most of these added functions evolved naturally as the need arose with no major impact on the organization. Today many of the services established because of missile requirements are being utilized on advanced fighter programs with considerable benefit.

Where the major differences between the aircraft and missile businesses have been found to be, is in some of the indirect functions and services that had to be supplied. Particularly, this applies in the much greater responsibility

There have been numerous requests by Federation members, as well as subscribers to the Analysts Journal, to have the talks given at the recent Regional Convention of the New York Society of Security Analysts made available. Because of this demand we are printing all contributions that did not appear elsewhere.—The Editors.



the contractor must carry after physical delivery of the article, when normally, in the aircraft business, his task would be considered essentially complete. The major consideration is that a missile is only a part of a weapon system and does not become a weapon until all elements of the system are provided and integrated into a functioning usable whole. In the case of REGULUS, the system is composed of the missile, the ship to carry it, a trained crew to operate it, shipboard guidance equipment and operators, checkout equipment, maintenance equipment, the warhead and special weapons crew to handle it, handbooks and instructions, and an entire system of supply and logistics to provide checked-out missiles, spares, fuel and rocket boosters at dock side at the time, place, and in the quantity required.

In a missile program, as in aircraft, the financial return to the contractor comes almost solely from the sale of production airframes delivered out the plant door. From some of the foregoing discussion it can be seen that, in general, the total costs will be considerably higher for a missile than for a comparable aircraft. For each pound of delivered airframe there will be more engineering, more testing, and more inspection. Much more effort must be spent for each minute of flight time and a sizeable organization for weapon system coordination has to be supported. True, the costs of most of these items are borne eventually by the government, usually on a cost plus a small fee basis. However, there are currently no established or rigid procedures for funding many of the services industry supplies which are peculiar to the missile business. One year service coverage may be procured separately, the next, it may be in the price of the missiles, and the third, it may be absorbed in overhead. Whether this situation will continue to be acceptable to industry is not known. However, the net result

is that missile prime contracting does not, without large production which occurs rarely, offer a return commensurate with the effort expended and the dollar volume of contracts involved.

In conclusion, I should like to leave you with a few opinions formulated from our association with missiles over the past decade.

First, guided missile business in an aircraft plant is a decided asset not at this time so much from any direct return, but mainly, through supported missile work, skills and talents are developed that apply directly to improving a firm's competitive position in the aircraft field. It is also generally held that in the near future continued growth in military aviation will be predominantly in the missile field.

Secondly, the award of a guided missile contract does not necessarily mean more profits. It is still a high risk and the opportunity for profit is not commensurate with the risk involved.

Third, do not believe the press publicity about missiles. Missiles generally are subject to a glamorous connotation by the public and hence are treated sensationally in the press. However, any material which in any way reveals the true state of development or performance of a current missile is by law classified and cannot be revealed in the public press.

Finally, missiles are not magic. They are merely another product of several of our industries that for years have been turning out devices of equal complexity made from the same materials to similar standards with an equal input of skills. A stable of high priced scientists does not guarantee success in the missile business any more than it does in any other business delivering a product. The same factors of sound engineering, production know-how and good management are the ingredients for producing successful missiles as with anything else.

## STANDARD BRANDS

Incorporated

### COMMON STOCK DIVIDEND

The Board of Directors declared a quarterly dividend of 50c per share payable on March 15th to stockholders of record on February 15, 1957.

### PREFERRED STOCK DIVIDEND

The Board also declared a dividend of 87½c per share payable March 15th to stockholders of record on March 1, 1957.

John B. Noone  
Secretary and Treasurer

January 24, 1957



## OUTBOARD MARINE CORPORATION

### DIVIDEND NOTICE

A cash dividend of fifty cents (50c) per share on the Common Stock of the Company has been declared by the Board of Directors, payable February 25, 1957, to stockholders of record February 4, 1957.

H. M. FISHER, Secretary

January 18, 1957



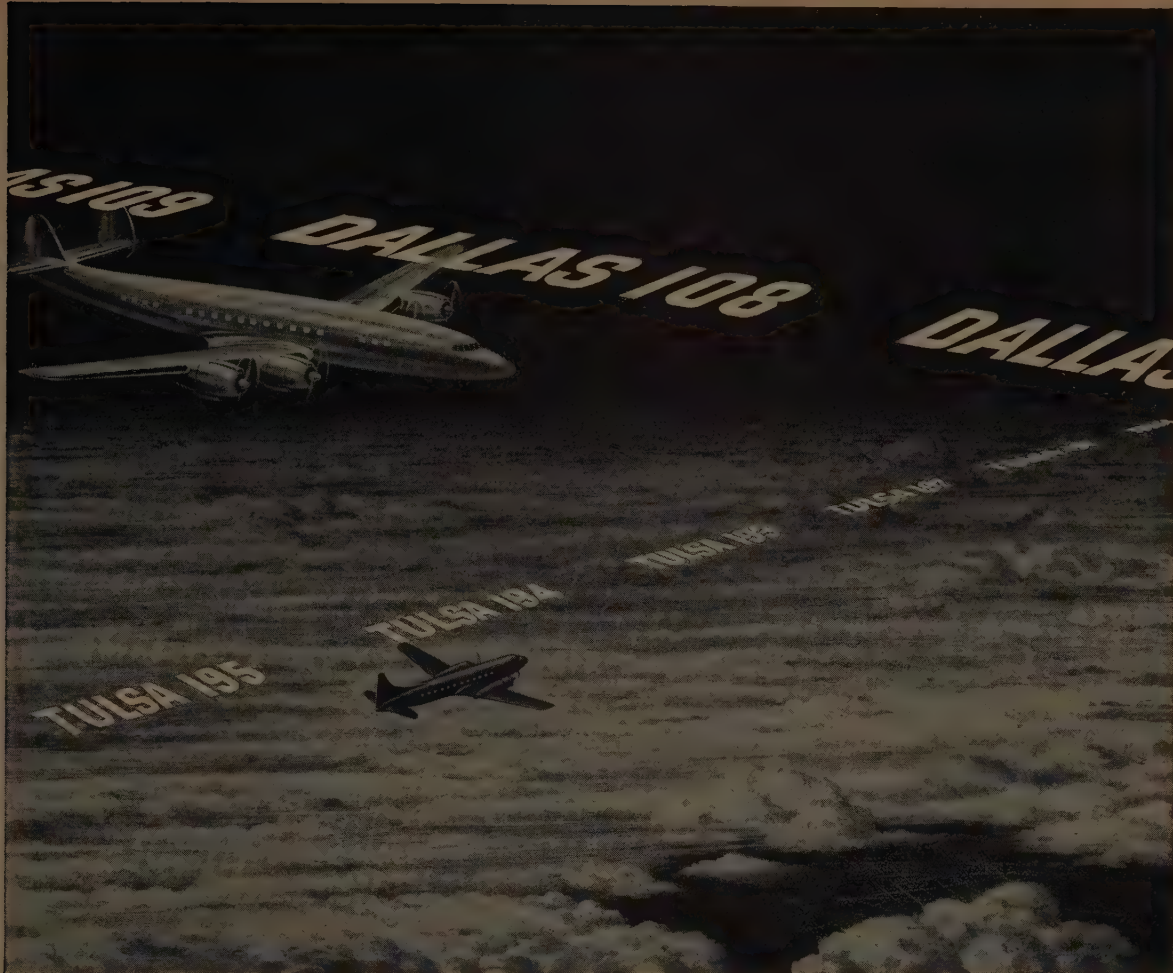
## AIRCRAFT RADIO CORPORATION

Boonton, New Jersey

### Dividend No. 96

On January 31, 1957, the Directors of Aircraft Radio Corporation declared a dividend of twenty cents (20c) per share on the common stock of the Company, payable February 27, 1957, to stockholders of record at the close of business February 13, 1957.

HERBERT M. KINGSLAND  
Secretary



**ITT** now provides—  
**continuous ELECTRONIC MILEPOSTS IN THE SKY**

**VORTAC**— *the new, automatic navigation system for all civil aircraft.*

From Federal Telecommunication Laboratories, a division of International Telephone and Telegraph Corporation, came TACAN (tactical air navigation)—to give our military aircraft the pin-point navigational accuracy and reliability, both in distance and direction from a known point, demanded for military operations at jet speeds.

Because the present nationwide navigation system for civil aircraft, called VOR, already provides the

directional information, the government's Air Coordinating Committee decided to add the *distance measuring* feature of TACAN—creating a *new* integrated system called VORTAC. Soon all aircraft—private and commercial as well as military—will receive *complete* navigational information from either TACAN or VORTAC.

In the skies, over the seas, and in industry... the pioneering leadership in telecommunication research by IT&T speeds the pace of electronic progress.



VORTAC airborne equipment is now available. For detailed information write to Federal Telephone and Radio Company, a division of IT&T, Clifton, N. J.



**INTERNATIONAL TELEPHONE AND TELEGRAPH CORPORATION, 67 Broad Street, New York 4, N. Y.**





ANACONDA  
*more than copper*

# MANGANESE

*as important to steel as iron!*

A world without steel is difficult to picture—but that's pretty much the kind of world we'd have if it weren't for manganese.

No matter by which of the modern processes steel is made, eleven to fourteen pounds of manganese go into every ton. And no satisfactory substitute for manganese has yet been found.

Manganese is important, too, in the chemical industry. And modern dry-cell batteries, like steel, could not be easily made without it. Most of the manganese used in the United

States must be imported, and two-thirds of the world's reserves of high-grade ore lie in countries behind the iron curtain. The strategic importance of manganese is plainly evident. Anaconda's importance in manganese production is quite clear, too. Currently, over half of the domestic production of manganese comes from the "Emma Mine" in Butte, Montana.

This vital metal is just one of many in Anaconda's line of non-ferrous metals and metal products—the most extensive offered industry today.

The  
**ANACONDA**  
Company

The American Brass Company  
Anaconda Wire & Cable Company  
Andes Copper Mining Company  
Chile Copper Company  
Greene Cananea Copper Company  
Anaconda Aluminum Company  
Anaconda Sales Company  
International Smelting and Refining Company

# Indian Point Nuclear Power Project

R. F. BROWER

*Assistant Vice President, Engineering,  
Consolidated Edison Company of New York, Inc.*

**D**URING THE PAST FEW YEARS we have witnessed phenomenal advances in the control and use of the atom for military purposes. Today we are at the threshold of equally rapid advances in the use of the atom for controlled power production. There will be many difficulties in the development of economic nuclear power, but with vigor and vigilance these difficulties will be solved and advances rapid.

We, of Consolidated Edison Company of New York, take considerable pride in the fact that our company was among the first of the investor owned utilities to join in the initial development of commercial nuclear power.

Our construction permit contains the conclusion that there is reasonable assurance that a reactor of the proposed type can be constructed and operated at the contemplated location without undue risk to health and safety, and provides that upon satisfactory completion of construction the commission will issue a Class 104 license to Consolidated Edison, the license to expire May 4, 1996. It also allocates to the company over a forty-year period approximately 12,500 pounds of uranium fully enriched in the isotope U-235.

Our first activity in the field of atomic energy for power purposes began about four years ago when we joined the study group now known as Atomic Power Development Associates. The decision to proceed, if practicable, with the construction of a nuclear power plant in our territory coincided with the passage of the 1954 Atomic Energy Act, when we asked several manufacturers to submit proposals on power reactors which they were ready to undertake to design and build for us. We accepted the proposal of the Babcock & Wilcox Company and signed a contract with them in the early part of 1955 to design, construct and erect a nuclear power reactor and boiler plant for us at the Indian Point site at a designated price.

At the outset, I should like to say that at least in its early experimental phase this plant will not produce power as economically as a conventional plant using conventional fuels. This understandably raises the question as to why we should undertake a project of this magnitude at this time.

There were several reasons for this decisive step. Foremost of these is the fact that conversion of energy from one form to another and delivering it to our customers in

a form which can be conveniently and economically utilized by them is the foundation of our business. Our management had a strong conviction that private industry had an obligation to do its part in the initial development of commercially feasible atomic power, and as Con Edison is one of the largest private utilities, it naturally would be expected to play a leading role in this development.

### ATOMIC ENERGY OF THE FUTURE

Atomic energy will some day become an important source of energy and as we are located in one of the highest fuel cost areas of the country, quite naturally we have a very keen interest in any development in which there is any future prospect of reducing the fuel cost component of our electric business.

In the past decade and a half, the cost of coal has doubled. In the last year, the cost of oil has increased 15%, and since 1952 gas, which we use in our electric plants during off peak periods, has increased 25% in price.

Immediately prior to the war, fuel costs accounted for about 11% of our total cost of doing business. Immediately following the war, this percentage had increased to 16.5%, and last year had reached 18.5%.

The prospects are that these conventional fuels will increase, not only in unit cost but also in relation to our total cost of delivering electricity. On the other hand, while it may not be economical in its early developmental stage, atomic energy does have the prospect that as experience and know-how are obtained, costs can be reduced substantially and the fuel cost element of our business can at least be stabilized and possibly reduced.

Our atomic power plant will be built on approximately 350 acres of land located about 24 miles north of New York City, at Indian Point, on the east bank of the Hudson River. Considering the heavy population density of the New York metropolitan region, the area in the general vicinity of the site is relatively sparsely populated. Within a half-mile radius there are only sixteen one-family houses and no industrial plants. In a five-mile radius there are about 45,000 inhabitants.

The plant may be divided roughly into three parts: the nuclear steam generator, consisting of the reactor, boilers, pumps and auxiliary equipment; the superheater, and the



conventional part, consisting of the turbines, generator, transformers and switching.

The reactor will be what is called a pressurized water thorium converter and will be fueled with highly enriched U-235 and contain alternate plates of pure thorium metal. The active portion of the reactor core will be a cylinder six feet in height and six feet in diameter. The fuel elements will be composed of square assemblies of fuel and fertile plates approximately two and one-half inches wide and six feet long, arranged with 0.1 inch cooling flow channels between plates. The fertile plates consist of thorium metal clad with zircaloy. The fuel plates will consist of a small percentage of highly enriched U-235 alloyed with zircaloy and clad with zircaloy. Initially, the core will contain about 600 pounds of U-235 and 20,000 pounds of thorium.

The name "converter reactor" is derived from the fact that as U-235 fissions in the reactor, some of the excess neutrons are captured by thorium, a relatively inexpensive material, which in turn becomes U-233, itself a fissionable material. As the U-235 is depleted, U-233 builds up and begins to fission and during the life of a core about one third of the heat generated in the reactor will have been obtained from the thorium or fertile material.

It is anticipated that initially the average life of the core elements, operating continuously at 100% load, will be one year, although the reactor will have to be shut down after each four months of full load operation to rearrange the core elements and renew a third of the core.

The reactor, as is characteristic of practically all reactors now planned, will have what is known as a negative temperature coefficient. This means that as the temperature of the core tends to rise, the nuclear activity decreases, giving a self-regulating characteristic, which is fortunate from the safety standpoint. As a further safety precaution, the steam generators, pumps and all equipment containing or likely to contain any radio-active water or equipment will be housed in two 80-foot diameter steel spheres of sufficient strength to contain any pressure released through a mechanical failure of any pressure part of the coolant system.

The reactor itself will produce 1,900,000 pounds per hour of saturated steam at 420 pounds pressure. If used in a steam turbine at this pressure and temperature, the output of the reactor would produce approximately 140,000 kilowatts of electricity. However, by heating this steam to 1,000 degrees Fahrenheit, additional capacity of 96,000 kilowatts can be obtained at a very favorable incremental over-all cost and fuel rate. Consequently, at an early stage of this project we decided to install an oil-red superheater to raise the temperature of the steam obtained from the reactor from 450 degrees F. to 1,000 degrees F., and thereby increase the over-all plant capacity from 140,000 to 236,000 kilowatts. As well as improving the efficiency, the superheater reduces the over-all cost of the plant from \$320 to \$235 per kilowatt of gross capacity.

The superheater, in addition to improving the economy, overcomes several objections. By superheating the steam, we will be able to use turbine equipment which will closely resemble the re-heat turbine in our newest station, Astoria.

It also avoids the troublesome problem of handling wet steam through the turbine. A third advantage is that by using high temperature steam, practically the entire plant—except for the reactor and steam generators—will consist of standard, modern equipment and in the event of failure of the reactor to perform as predicted, or in the event of irreparable damage to the reactor, all of the plant components except the reactor and steam generators will be fully recoverable by the installation of a high pressure boiler and topping turbine.

We estimate that the complete plant will cost \$55,000,000. About two-thirds of this cost will be for the superheater and turbo-generator, or the conventional part of the plant, and one-third for the reactor including the first core.

These estimates are based on initial design parameters and current costs of special materials and processing. The prospects are good that both the fixed cost and the operating cost components can be reduced. The reactor is conservatively rated at an equivalent electric capability of 140,000 kilowatts which with the superheater would produce 236,000 kilowatts of electric capacity. There is an excellent possibility that with minor changes in core design, the reactor capacity will be increased and with this possibility in view, we have purchased a superheater and turbine generator capable of producing 275,000 kilowatts. If this additional capacity can be obtained from the reactor, then the fixed charge component of cost would closely coincide with that of the Arthur Kill type of equipment.

The burn-up or life of the core is also conservatively estimated. There is likewise a good possibility that the core life can be extended, utilizing in place a larger percentage of the U-235 and U-233 produced in the reactor and if this longer life can be obtained, the operating cost component of the total will be reduced.

Regardless of whether or not these reductions materialize, the financial effect of the Indian Point project on our total business will be small. Accepting current estimates, the increased annual costs of Indian Point over conventional equipment will amount to a little over one-half of one percent of our total annual revenue. We feel that this is a small price to pay for progress.

Public acceptance of this venture has been unusually good. No serious objections have been raised by any of the communities within the general vicinity of the plant, and most of them are enthusiastic about the project. We have kept our Public Service Commission fully informed and we have no reason to believe that accounting for both capital costs and operating costs of this plant will differ in any respect from those encountered in a conventional plant.

Regardless of the outcome, cost wise, of the Indian Point plant, or any nuclear project in the foreseeable future, the impact on our business is likely to be small. As I previously stated, fuel in 1955 accounted for about 18.5% of our total cost of doing business, and this part of our costs is the yardstick by which nuclear power or any new electric production process must be measured.

Our schedule calls for the plant to be in operation in 1960, and I should like now to invite the Society of Security Analysts to place upon their agenda for 1961 an inspection trip to the Indian Point nuclear power plant.

# Industrial Applications of Radioisotopes

WILLIAM E. BARBOUR JR.  
*Former President, Tracerlab, Inc.*

**B**ECAUSE OF THE DIVERSE and heterogeneous nature of industrial uses of isotopes, I am going to limit my remarks to a few statistical facts and then describe just one very typical application—a beta thickness gauge as installed in a Detroit plant manufacturing tire cord stock.

As security analysts you are very probably going to ask questions about the nuclear industry itself—those small but growing companies manufacturing nuclear instruments, beta gauges, and radioactive chemicals and pharmaceuticals. I have, anticipating such interest, brought with me some of the tables and slides which I used in Chicago at the recent Atomic Industrial Forum meeting on the progress of these nuclear companies themselves. I shall of course be glad after this session to discuss this material with any of you who may have questions on that subject later. My remarks here bear more on what industry in general is doing with the products of the nuclear companies and especially the beta gauge.

The Atomic Industrial Forum recently surveyed the 10 year history of radioisotope applications in industry. Their source of information was the AEC summaries, which should be just about 100% reliable and complete for the U. S. at least. They report 1020 organizations which have to date used radioisotopes in 1347 plants or locations. Five states each have more than 100 such plants or installations using radioactive materials—California, New York, New Jersey, Ohio and Pennsylvania.

The most prevalent use of isotopes in industry is still surprisingly enough in industrial research labs for basic investigations and testing purposes. Process industries, especially those manufacturing sheet materials, the petroleum industry, chemical industry and metal working are the principal "applied" industrial users of radioisotopes.

The most important direct and routine application is in the automatic gauging and control of thickness of sheet materials and coatings by absorption of beta or gamma radiation. More than 400 companies are using thickness or density gauging techniques on a regular basis. Next comes radiographic inspection, also based on the selective absorption of radiation—usually gamma rays—with 350 users. The third most frequent direct industrial application is categorized as radiation effects where the gamma rays themselves kill micro-organisms in foods and drugs or improve the strength or raise the melting point of polymers through the so-called cross-linking of their complex molecules.

Now the uses of radioelements in industry can be broken down into three general classifications depending on the principle employed:

## *I. Where Radiation Affects Materials*

(This is perhaps the least developed category of use but may have the greatest potential, especially because of the enormous quantities of fission products soon to be available

from the various power and research reactors across the country)

a) Polymerization or increasing the strength of plastic or raising its melting point, as just referred to above.

b) Static elimination or concentrated radioactive sources sometimes called iontoons for dissipating hazardous or otherwise harmful static electricity charges in printing plants, rubber processing and even in connection with eliminating some forms of static in aircraft radio communication.

c) Phosphors and light sources where radioactive materials can be put in combination with phosphorescent materials such as ZnS or more uniquely where for a weak light standard or other use a clear plastic may be made self-luminiscent.

d) Destruction of bacteria or other micro-organisms with large gamma sources as in food preservation and sterilization of packaged drugs after they are sealed in containers.

## *II. Where Materials Affect Radiation*

a) Radiographic inspection of castings, sealed machine parts and such difficult inspection jobs as airplane propeller blades, pipe lines, pressure vessels, and special jobs as ascertaining that the firing pins in artillery shells are in proper position in an automatic production set-up.

b) Thickness gauges for measuring and even automatically controlling the thickness of sheet materials or coatings at the point of forming or fabrication.

c) Density gauges for measuring the weight of materials in gas or liquid form such as the amount of tetra-ethyl lead in vaporized petroleum fuels.

d) Liquid level gauges for indicating or continuously controlling levels in sealed vessels or viscous materials—that is rubber cement or molten metals.

e) Soil moisture gauges using the property of water to slow neutrons—highways, airport and foundation construction uses.

f) Carbon-hydrogen ratio gauge for determining quickly the proportions of certain hydrocarbons in a mixture such as gasoline.

## *III. Where Radioactive Material is Used as a Tracer*

a) Fluid flow control as for example to determine the interchange point between petroleum products at the terminal of a long pipe line.

b) Chemical reactions where it is desirable to determine proportions of specific materials in closed systems as in a chemical processing plant.

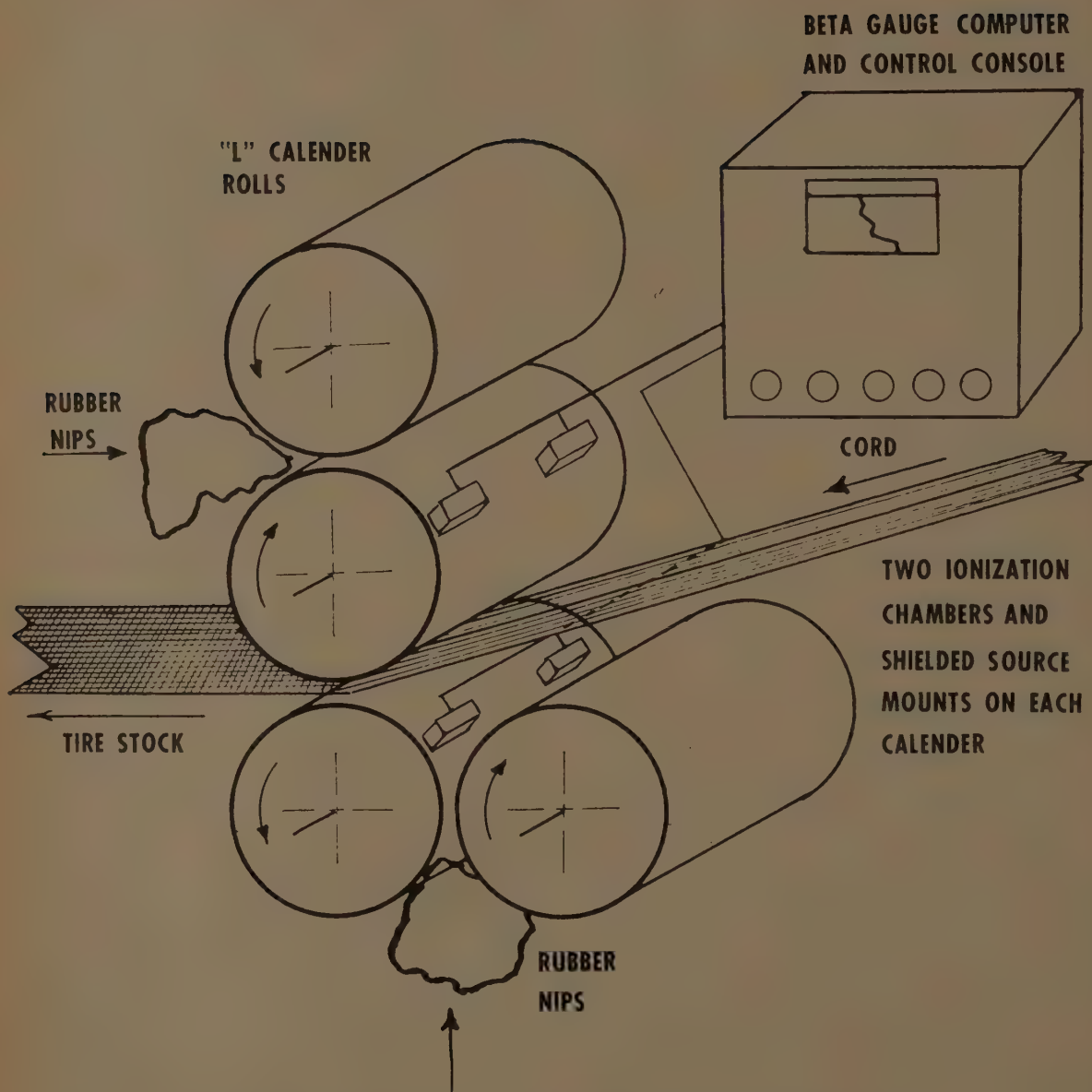
c) Corrosion studies or friction wear studies—lubricants, tires or bearings.

d) Detection of leaks in chemical or processing plants.

e) Catalysts in certain chemical reactions.

f) Detergency of certain soaps or chemicals.





BACKSCATTER BETA GAUGE ON CORD TIRE STOCK CALENDER ROLLS

A beta gauge derives its name because it employs the principle of measuring thickness by the amount of beta particles or electrons absorbed by the material being measured. The beta rays are given off continuously by a radioactive source. This absorption is proportional to the weight, density or for a homogeneous material to the thickness of the material being measured and passing between the radioactive source and a sensing or detecting head. By aiming the source and detecting head in the same direction and placing a radiation shield such as lead between them a coating can be measured directly provided that it has a different density than that of the material being coated. This is called a back-scatter gauge and it provides incidentally a means for measurement for example of rubber sheet almost exactly at the point on a calendar roll at which it is being formed.

Such radioisotope sources as radioactive rubidium, cesium, strontium, krypton (gas) or secondary reflected radiation called Bremstrahlung can be used.

At the Detroit plant of U. S. Rubber Tracerlab recently installed a completely automatic gauge using a strontium source and the back-scatter principle so as to correct any deviation from the standard right at the point of manufacture.

The chart shows the "L" arrangement of the calendar rolls forming the tire stock with the cord going in between two layers of rubber as it is formed into sheets. In addition to controlling the thickness of the rubber, this gauge holds the fabric exactly in the middle which is a feat never before possible in making tire stock. The resulting product will thus make a better balanced tire and one which will not encounter premature wear on the fabric.

The estimated savings in material alone from this gauge on continuous operation is \$300/hour, plus the advantages of a better product, and a more balanced tire for high speeds. The amount of savings is derived from a material reduction of about \$40/hour per 0.0001" of rubber. This one machine processes 140,000 feet of stock a day at more than 100 feet/minute. The Gauge also records the thickness for a continuous quality record.

Before the beta gauge was installed there was an average of 3 mills error between the thickness on one side of the sheet and the other, some of which resulted from eccentricities developing in the rolls. This is now, for all intent and purposes, entirely eliminated.

So called pig feeding of the calendars or putting the rubber in by hunks used to cause cyclical variations of 3 mills (or thousandths of an inch) and this has with the gauge been reduced to one mill.

This gauge has the most complete calibration of any gauge in the world. That is it:

- a) Gauges the rubber stock and notes any error.
- b) Waits by timed electronic delay systems to see if it is a real or just a transient variable.
- c) Then feeds back the indicated correction to the screw-down motors on the calendar.
- d) Then waits for the time from the "nip" or where the hunk of rubber goes from the front side of the rolls to the point of measurement sensing—plus the inherent time lag

of the gauge sensing operation—and then makes the proper correction.

e) If any error still exists it then puts in another correction.

f) If the next correction should then be in a reverse direction from the first one, it feeds a compensation for system backlash to the next correction.

g) The so-called transport time lag or the time from the point of tangency of the rollers to the measuring head is locked to the speed of the calendar in case that speed is varied from time to time.

h) The gauge head including the radioactive source and sensing element on C-frames and withdraws and re-calibrates itself every 15 minutes. This corrects for any drift due to temperature or air pressure changes, which are inevitable in such a sensitive detecting system.

If savings are assumed as estimated or \$600/day, the pay-off on the beta gauge would at \$60,000 for the installation be in about three months. Actually the savings were found to be even greater than this.

Each gauge with such automatic features is naturally an individual or custom problem. Similar gauges are measuring or continuously controlling plastic, aluminum foil, paint, cheese slices, Tampex, soda cracker dough, foam rubber, cigarettes, sandpaper, glass and adhesives.

The AEC several years ago estimated that 6,000 U. S. plants could profitably use beta gauges employing radioactive sources. Less than 10% of this market has been tapped to date. The gauges as well as many other pieces of apparatus using radioactive materials for control in industry are rapidly approaching a completely reliable and practical state of development. Many of these new applications must employ like the beta gauge extraordinarily precise and delicate measurements formerly only possible in air conditioned laboratories. The gauges must work, of course, instead in hot, humid, dusty, acid and frequently vibrating environments. In these environments they must operate with comparable reliability and freedom from breakdown to that of the landing gear of a commercial aircraft.

There is a great abundance of latent ideas and techniques for industrial controls using nuclear principles today but the big challenge is to keep striving for ruggedness and reliability so the systems can be counted on just as certainly as the airline pilot does when he throws the landing gear lever down.

I would like to describe if there were time some of the other types and uses of radioisotopes in industry, equally exciting, and which I know you will hear more and more about in the years immediately ahead. I think the period of most rapid progress in industrial applications of isotopes will be in the next ten years when emphasis will be placed on more reliability and sound engineering rather than technical novelty. The beta gauge has for all practical purposes just about reached that stage now—many other industrial control systems employing radioactivity will soon come out of the conceptional and experimental phase and get the engineering treatment that will make them into new tools for industry which will both save significant amounts of money and improve quality in the manufacture of products.



# Can you name these Thompson products that make life safer, easier, happier?

**"People-Protectors"**



You could call Thompson's rotor compressor assemblies just that. They withstand high heat while their blades rotate at 10,000 rpm in the engines of jet aircraft. There isn't a single military or commercial American plane that hasn't precision-made Thompson parts! These dependable Thompson parts have contributed to better aircraft performance and safety for you.



**"Danger-Detective"**

That's just *one* important job a Thompson-Dage closed-circuit TV camera is doing for industry and business today. This ever-alert "private eye" spots trouble instantly on TV monitor screens. Dage closed-circuit TV is also used to nab shoplifters, protect security areas, check incoming freight cars, stand guard over nurseries and sickrooms . . . its uses are literally endless.

**"Fish-Finder"**

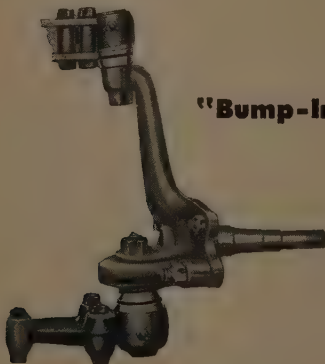
Thompson makes high-quality light-metal castings for sturdy aluminum outboard motor propellers to help you get where the big fish are running . . . but once there, of course, you're on your own. Thompson produces close-tolerance, durable light-metal castings for such widely diversified products as washing machines, garbage disposers, ice cream scoops, gas meters, jet planes, industrial engines and many others.



**"Farmer's Friends"**



Definitely! These Thompson valves, found in the engines of farm tractors, are famed for dependable performance and long life. Other Thompson valves are hard at work in the car you drive, the buses and planes you ride, the trucks that carry the merchandise and foodstuffs you use daily, and perhaps even the mower that keeps your lawn trim and tidy.



**"Bump-Ironer"**

Yes, the Thompson-developed ball joints for front suspension on cars iron out the bumps. They insure easier, smoother and safer driving. This is but one of many noteworthy contributions developed by Thompson engineers for the automotive industry including pistons and piston rings, valves, cylinder sleeves, Sky Ride shock absorbers, water pumps, tie-rod ends and many more.

*Thompson research is at work for you*

A combination of America's finest laboratory, research, testing and production facilities . . . plus top-notch engineering staffs . . . make Thompson one of the country's most dependable sources of supply for *precision-manufactured* products. These are the products that help make life safer, easier and happier for you. Thompson Products, Inc., General Offices, Cleveland 17, Ohio.

**You can count on**

**Thompson  
Products**

MANUFACTURERS OF AUTOMOTIVE, AIRCRAFT, INDUSTRIAL AND ELECTRONIC PRODUCTS. FACTORIES IN SIXTEEN CITIES.

# A Look at the Next Four Years

GERALD M. LOEB  
*Partner, E. F. Hutton & Co.*

**F**RANK LLOYD WRIGHT WAS WELL over 80 before he became a member of the American Institute of Architects. I hope I do not have to wait that long to become a member of the New York Society of Security Analysts.

We meet in an atmosphere of enthusiasm.

The election should please all investors.

The question is what do we have in store for the next four years.

Four years ago, when President Eisenhower was elected, the market had been more or less in a trading range for a year and a half. After the election, the market advanced sharply into the early part of 1953. However, liquidation followed and the market turned downward until the Fall of the year. The immediate cause of the downturn was the sincere effort of the new Administration to achieve a really sound dollar. Politically, this did not prove much of a success. Substitution of a so-called "stable dollar" for a sound one started the market up. As we all know, the ensuing advance has been sensational.

There were plenty of real bargains to be had in the Fall of 1953. Certainly, a large portion of the advance was justified.

The position now is a little different. The stock market is not only up but in some respects has become very popular. The early 1956 census of the New York Stock Exchange suggests that 8,630,000 people owned shares in publicly held corporations. This census suggests that since 1952 over 500,000 people on the average are joining the American stockholder family every year. The very future of American capitalism rests on a continuation of this expansion. Inflation, population growth, new products, rapid obsolescence and a rising standard of living have all combined to greatly increase the amount of capital required to support a healthy economy. Our current tax laws make it difficult for our corporations to lift themselves by their own bootstraps and finance modernization and expansion solely from retained earnings. In the natural course of events, new corporations must be born. All this requires increased shareowning. If the people of the nation fail to save sufficiently and fail to invest a proper proportion of their funds in common stocks or senior securities, then government financing is the only other answer. None of us here wants to see that happen.

Equity ownership has always been profitable and always

will be. It is usually the preferred investment of the wealthy and the intelligent. These groups understand its advantages as well as its drawbacks.

Corporations publish profit and loss statements. This means that sometimes they "make" money and sometimes they lose money. Every type of investment has similar risks. People who have saved since 1932 and kept their dollar investments have lost very heavily in purchasing power. People who have owned stocks since 1932 have gained in appreciation of their shares and in increased dividends by various percentages of this purchasing power loss, depending on their expertness in selection and timing.

What concerns me today is the spirit that seems to be around that "stocks are good for everybody." I agree with this, but with the proviso that they are only good if the right issues are selected, in the right amounts and at the right time and price. I am not comparing 1956 with 1929 as some inadvertently did when the Dow-Jones Industrial Average crossed the 1929 high of 381 at the end of 1954. Most people who sold out at the end of 1954 or in early 1955 are sorry now. I always feel one can do as much harm getting people to sell at the wrong time as getting them to buy at the wrong time. There are a great many obvious differences between the 1929 and the current period. However, there is one similarity. Back in 1929, everybody was talking about what was thought to be a wonderful new theory of equity investments for all. This was expounded in a widely read book. I think it was called, "Common Stocks as Long-Term Investments," written by Edgar Smith. Today, the same theory is again being set forth in many books, in many speeches, by many security men and in many advertisements. I personally believe it—but with more reservations than are currently being mentioned. Many of the new stockholders are not fully educated as to the problems as well as the advantages of common stock ownership—they are certainly not fully educated as to how to begin.

It is vital to us in the security business and, as I have said before, it is also vital to the survival of capitalism in this country, that shareowning keeps its current good name. It would set us back many years if a sizeable proportion of the new first investors became in any way disillusioned.

That is why I recommend some caution and some restraint.



Let us take one pertinent indicator of the situation. I think we will all have to agree that frequently the odd-lot buyer is the least financially educated of all security buyers. It is regarded by many as being so obvious that it does not need substantiation. The successful odd-lot buyer leaves the odd-lot ranks and becomes a round-lot buyer. The Brookings Institute's study of odd-lot trading made in 1939 indicate that odd-lot buying on balance after averaging moderate proportion for some years shot up to an excess of almost 16,000,000 more shares bought than sold in 1929. When the curtain rings down on 1956, I think the excess odd-lot purchases over sales will total well over 20,000,000 shares for the last two years.

I am not a believer in any odd-lot theory of market forecasting or any other kind of theory. In fact, those investors who have continuously followed old-fashioned odd-lot principles that at one time seemed valid have been left out in the cold.

The fact is that despite all this buying and despite continuous pension fund and other institutional buying, the stock market has really been executing what looks like a turning movement. At various times since the Summer of 1955, several important groups and individual issues made their highs and declined substantially regardless of the fact that the current level of the Dow-Jones Industrial Average is very close to its all-time high. For example, a prominent leader such as duPont is off about 22% from its July 1955 high. A great growth stock like Radio is off 33% from its June 1955 high. New York Central, a major railroad in process of being rebuilt with a bright future in front of it, is off over 20% from its July 1955 high. Many other issues made their peaks in September and December of last year and quite a few in April and August of this year.

In brief, the number of issues participating in the bull market has been quietly decreasing.

The key to successful investment in the past four years has been to buy the best stocks and sit with them. This policy has been applied by the shrewdest institutional managers as well as the least informed odd-lotter, with equal success. I do not believe that this policy will succeed in the four years ahead.

For one thing, I feel the key to success in the next four years will call for a more flexible policy. Investors will have to learn to sell as well as to buy and at times to sit with cash as well as equities.

For other reasons, I think the special situation rather than the favorite blue-chip will pay off best in the four years to come.

It is going to be more difficult to secure profits in the period ahead. In fact, the problem may turn out to be one of achieving safety rather than gain.

In the future period, the stimulus of easy money is apt to be lacking. In my view, the shortage of money and the higher rates resulting are not political in character. They are fundamental. The rate of savings in this country has simply not kept pace with capital requirements. Installment loans are a problem today. In time, we will get used to the current money rates. They are much more traditional than the rates of the 1933-53 period. They necessarily affect the volume of business and the income yields of equities.

There is every indication that gross business volume will continue high. Profits, on the other hand, are apt to be more difficult to maintain. Too much reliance should not be placed on so-called "built-in controls." Under modern conditions, I think the government can ameliorate broad over-all depressions. It certainly can not prevent corrections and recessions in individual industries or in the prices of specific commodities. The 1956 decline in motor car sales and the farm situation should serve as proof. No built-in prop can switch people from watching television to going to the movies.

Consequently, profits are more likely to come from moving rather than sitting. There will be times when it will pay to have cash.

This is important. Too many people feel that spare cash should be "working" at all times. By "working," they mean having it invested and earning dividends. Cash can be worth many times what it can earn in dividends if it is available to use when stocks are cheap.

I am reminded of a very famous investment counsellor. Quite some years ago, he gave a group an extensive speech on what to buy. The market went down and each month he told them to buy more at constantly decreasing levels. He never told them where the additional money would come from. Those who invested all their money at the first meeting were locked in and could sit or sell, but the bargains went to others.

Therefore, I say do not be in a position where you can not move in either direction.

Stock selection for the next four years will be a question of special situations undervalued in a possibly static background. I do not think it will pay to just depend upon earnings and dividends going up and up and price earnings ratios along with them and yields going down and down.

The fly in today's ointment is that the biggest prop in the market is the psychological prop, as evidenced by the price-earnings ratio. As analysts, you know that the P-E ratio has greatly increased reflecting investor confidence. Since 1953, estimated earnings for the Dow-Jones Industrials are up 31%, dividends are up almost 40%, income yields are down from an average of 5.9% to the current 4.6%, and price-earnings ratios are up from an average of 10.1 times earnings to an estimated current ratio of 13.7. The Industrials themselves are better than 90% above their 1953 lows.

A basic difficulty in selection is that if you agree that our best blue chips are too much in style, what is there left to buy? The fact is the professionals and the public have both been right in the past four years, or for that matter in the past ten years, by buying only the best. The facts of our economic situation have largely favored the best getting better and the big getting bigger. Exceptions have been difficult to uncover.

There is one policy I am certainly not going to advocate. That is any policy that involves buying the second best. It has not paid off in the last four years and it will not pay off in the next four years.

The keymark of my remarks today is—if you feel that blue chip stocks are temporarily overpriced, look for blue

chip management in directions where its efforts have not yet been fully reflected. At all odds avoid the mediocre and the also-rans.

Investment selection, as I practice it, begins with management. I do not diversify by industry. I diversify by people. If you look at it this way, you can open the door to some special situation purchases without trading down.

Where can we make money in the field of undiscounted possible earnings increase? I think if anywhere, it will be in the motors.

Where can we make money in the field of possible higher investment regard? I think perhaps in the steels and aircrafts.

The aircraft stocks have come a long way in the last four

years but they too are in the 10 to 11 times area because seemingly the investment public rates them as prince and pauper war babies. I think that future aircraft earnings can be projected with possibly far more accuracy than many other industries you might select.

I think there is money to be made in selected oils.

In closing, remember we are still in a news market because of the world situation. A climax because of over-enthusiasm over the election results is more of a probability than a possibility. These factors strengthen my suggestion to go into this coming four years more liquid and with a willingness to alter one's point of view.

\*Securities that were suggested by Mr. Loeb may be obtained from him.

---

## Business and the Stock Market Outlook

RALPH A. ROTNEM

*Partner, Harris, Upham & Co.*

**I**N ATTEMPTING TO UNDERSTAND the causes of our unprecedented period of business activity with a seven year bull market, there may be value in listing leading fundamental factors. One should attempt to determine which circumstances are still in force and which are losing their influence. Perhaps this period of prosperity has been based on an unusual combination of favorable factors, a combination which can not be expected to occur often in our economic history, and which is most likely to take place after a long war or a severe depression.

Among the sustaining long term bullish factors are:

1. When the history of this period is written the historians and economists will refer to this as a scientific or technological revolution similar to the industrial revolution that started in England back in the 18th century. This means new growth industries such as atomic energy, solar energy, electronics, chemicals, drugs, automation, rare metals, jet airplanes, etc. In addition to being economists, financial experts, and psychologists, the analyst of the future must have a knowledge of science or at least sources of accurate scientific information and opinions.

2. The great improvement in business management. Decisions today are based on accurate information. The higher quality of security analysis in the past twenty years also deserves mention. Investors all over the world should be grateful for the work of the Societies of Security Analysts. Their efforts are reflected in the articles appearing in *The Analysts Journal*.

3. The fact that stocks have become respectable so that many conservative institutions are now buying and holding them. The influence of these institutional investors has been most desirable since it has taken at least some of the emotionalism out of investment decisions. Many of these institutions have found that stocks are a good inflation

hedge. They also are able to get better statistical information today on which to base their decisions.

4. The new political philosophy. Large scale unemployment would be political suicide. If unemployment reached 10%, a new spending program and more inflation would be likely to come quickly.

5. Built in business stabilizers—such as unemployment insurance, etc., which should help to stabilize our economy.

6. Defense needs. Defense has become a new \$40 billion industry and as long as the Communists misbehave, this industry should be supported regardless of what happens to peace-time business activity.

7. Population growth.

8. Growing power of labor organizations—again an inflationary influence.

Factors which have been important since the war but which are or could be of declining influence in the future (some have already shifted over to the bearish side):

1. The large deferred demands which resulted from the war economy and from the long depression in the 1930's. Ten years of large scale production have removed this as an influence.

2. Aid to Europe. This was urgent after the war especially in the attempt to check the spread of communism. Actually from 1946 through 1953 this country, through loans or gifts, transferred to the rest of the world \$33 billion worth of goods and services, excluding military supplies. Now Western European industrial production is 70% higher than before the war and some of our industries are beginning to get competition from foreign producers.

3. Removal of the Excess Profits Tax late in 1953. This contributed to the sharp advance of the stock market in 1954, especially in growth stocks.



4. Decline in the purchasing power of the dollar. This may seem a strange place to list this factor in view of the continuing threats of inflation. But it is included because we are referring to the sharp decline in purchasing power that takes place during and shortly after wars. For example, from 1939 to 1949 the value of the dollar declined at an average rate of 5% a year, from 1949 to 1956 the rate changed to an average of 2% a year while during the past four years it has averaged only ½% a year.

5. Stimulus of the Korean war orders.

6. Government's easy money policy after the war. Now we have had six increases in the discount rate in the past two years and the money policy is shifting to the bearish side.

7. Large increase in debts. Private debts have increased \$248 billion in the past ten years, a rate that is about double the long term average. Since the end of the war consumers' credit has increased nearly seven-fold. The increase in debt has been a big stimulus to demand but there could be a danger if the increase continues at this rate.

8. Inventory accumulations. These were necessary after the war to fill the pipe lines and to take care of the large increase in sales in recent years. Whether debts and inventories are too large today is a question that has been debated at great length by economists. In relation to Gross National Product and to Personal Income they are not at dangerous levels yet. But as someone has said, both debts and inventories do not look dangerous when business is expanding. They become burdensome when business declines.

9. The stimulating influence of accelerated amortization which made many companies willing to expand their plants and equipment. Now there is uncertainty whether the government will continue this program except in a few industries important to defense.

10. The statistical cheapness of stocks in 1949. I wish we were all seven years younger today because prices in 1949 were very cheap from a statistical angle. Back in 1947 I found it much easier to be bullish on the stock market before this group. It was a talk called "An Illegitimate Bear Market." I was too bullish in one respect. I did not predict that the market would still have to go down another 10% in value to its low in 1949 and that it would take a disgustingly long period of 23 months to do it. In another respect I was too bearish because I said that with the earnings, dividends and book values we had then we should be able to recover to around the 1929 levels. As you know the market did that by 1954 and has gone considerably higher since then. The following figures give a comparison of 1949 values with those of today:

	1949	Today	Increased Cost
Cost of \$100 worth of annual earning power	\$ 650	\$1,360	109%
Cost of \$100 worth of annual dividends	1,400	2,530	81%
Cost of \$100 worth of book value	91	220	141%
Cost of buying the same income from stocks as from a \$1,000 high grade bond	370	895	142%

The extreme undervaluation has been corrected during this bull market and we are now at a stage where further gains will have to depend on increases in earnings and dividends or on psychological factors which would make people willing to pay more for earnings power and dividends than they normally do.

The favorable long term factors should be important influences that could give us a prolonged period of business prosperity especially in the companies and industries benefiting from scientific research and good management. There should be ample opportunities in the future for the investor in many growth industries.

The danger today is that some people may project the future course of business on the basis of the recent trends which are a result of an unusual combination of favorable factors which cannot be expected to be seen often or to continue too long in economic history. If we project recent trends we may become too optimistic and overexpand. The fact that many of the past favorable influences are wearing a bit thin should call for some caution. Fortunately the Federal Reserve Board is taking steps to iron out the business cycle and to avert the extremes of optimism and pessimism that have plagued our economy and stock market in the past.

#### ELECTION RESULTS

The election of President Eisenhower was a development preferred by the majority of people in this country. However, a study of past election year trends shows that economic and financial conditions have been more important influences on market trends. When President Eisenhower was first elected in 1952, thus ending a twenty-year rule by the Democratic party, the market responded with an 8½% rally during the next two months. But this rally was cancelled out and a 14% decline occurred in the next nine months, reflecting tighter money conditions and the threat of a decline in business activity.

Ever since President Roosevelt said, "We planned it that way," in explanation of the setback of business and the stock market in 1937, there has been suspicion that any Administration would prefer to see needed adjustments come early in its new four-year term, so the economy could again be pointing upward before the next election year. Since the 1930's the Government has been a large spender of money and in recent years it has accounted for between 20% and 25% of the total spent in this country. It can greatly influence the business cycle by its spending and taxing policies. Perhaps this partially explains why the stock market has had declines of from 5½% to 35%, or an average loss of 19%, from its level on voting days to the low points in the post-election years in the 1932-33, 1936-37, 1940-41 and 1948-49 periods. There was an exception to this pattern in 1944-45, but that was due to the fact that the war ended in 1945 and was a greater influence on the market. The decline that time was postponed until 1946.

#### WAR NEWS

The news from both Egypt and Hungary is also important at this time. Security and market analysts can hardly

be expected to be military experts or to know where or when trouble will develop next in this tense world. However, we can be expected to know how the stock market generally responds to unpredictable news. Since 1898 there have been several times that the market has had to discount similar news. The record is as follows:

Event	% Loss	Days of Decline	% Losses Recovered
Battleship Maine Sunk (1898)	16	32 days	100 in 37 days
Lusitania Sunk (1915)	11	32 "	100 " 16 "
Austrian Crisis (1938)	27½	31 "	100 " 96 "
Munich Crisis (1938)	14	53 "	100 " 11 "
Czechoslovakian Crisis (1939)	22	24 "	100 " 130 "
Poland Invaded (1939)	7	17 "	100 " 9 "
Fall of France (1940)	25	26 "	72 " 127 "
Pearl Harbor (1941)	9	17 "	75 " 9 "
Berlin Crisis (1948)	9	72 "	82 " 18 "
Korean Crisis (1950)	12½	13 "	100 " 43 "

The significant observation in the above figures is the behavior of the market after the emotional news is discounted. In each case a recovery cancelled 72% to 100% of the losses. Bull markets seldom, if ever, end because of a news event. They usually exhaust themselves in a wave of optimism when it is difficult, on the surface at least, to find a good reason for selling. A bull market is to be questioned more when it declines on good news than when it sells lower for a reason that is obvious. Good selling does not like too much company.

If a serious and large scale war developed and this country became involved in it, the outlook would be changed. It would probably be bearish on the market at first because of the uncertainty as to the new tax laws. After tax rates are established investors can intelligently proceed to protect themselves from the ravages of war time inflation.

#### BUSINESS OUTLOOK FOR 1957

Business activity should remain at a high level through at least the first quarter and probably into the second quarter of 1957. This will be the result of the high level of employment, increased defense spending, large consumer spending, the big unfilled demand for steel, the revival of the auto industry, and some further gains in capital expenditures. But there are several strikes against the business picture for the latter part of 1957:

1. Tighter money conditions and the threat that they will be even tighter next year will put the brakes on the marginal type of business expansion. The Federal Reserve Board seems serious in its attempts to avert inflation and a speculative boom that could lead to trouble later.
2. Fears that some industries have been expanding production facilities too fast.
3. A downtrend in profit margins in certain industries which affects earnings and which may discourage future expansion plans.

4. The trend of sensitive business indices such as those explained in the pamphlet "Statistical Indicators of Cyclical Revivals and Recessions," by Geoffrey H. Moore, and also the studies of similar indices by the National Industrial

Conference Board. At the present time these studies suggest skepticism as to the business trend in the months ahead.

5. An important factor will be the future rate of savings of individuals. Recently people have tended to save more and spend less of their incomes. The rate of saving has increased to 7% from the 5% rate of last year.

#### IS THE STOCK MARKET A WEAK PART OF OUR ECONOMY?

Almost anything can be proved with statistics. In my office I have a chart of the stock market averages drawn on an arithmetic scale to show actual dollar changes. Depending on which averages one uses, it shows the market at its 1956 peak to be 80% to 100% above the 1929 high. I keep this chart out of sight because I suffer from acrophobia every time I look at it. Acrophobia, according to the dictionary, is a fear of high places.

When I want to become more optimistic I look at a chart drawn on semi-log scale which shows percentage changes. This pictures the bull market in a less spectacular way. Actually the gain from 1949 to 1956 was 220%, which compares with a gain of 345% in the bull market from 1923 to 1929 and a gain of 370% in the major up-trend that lasted from 1932 to 1937. When I want to feel even more sanguine I make what seems to be a fair adjustment to a constant dollar basis, because the 1929 dollar is worth only 63 cents today. That chart indicates the market is only 20% higher (not 80% to 100% higher, as the un-adjusted averages indicate). When I desire to be rid of the acrophobia I relate market prices to earnings and dividends, which seems the fairest comparison of all. This shows the market to be about 30% cheaper than it was at the peak in 1929.

It may also be of interest that recently about 40% of all listed stocks were still selling under their 1946 highs in spite of the fact that the general market averages were 145% higher than they were at that peak. Also out of 120 industry groups (such as steels, auto, rails, etc.) 70 of them, or 58%, are now selling near the lowest ratio to the general market that they have sold at since 1946. Nor have we had a real period of careless speculation in the cat and dog stocks since 1946. At present the ratio of an index of low-priced issues to the general market index is around 85% (pre-war 1936-39 was 100%). At important peaks of bull markets in the past this ratio ranged between 150% and 200%. The turnover of listed stocks is also much lower than during the enthusiastic trading that has taken place near other peaks. Recently it has been about one half of the rate that it was in 1946, one third of what it was in 1937 and only one tenth of the 1929 rate. Furthermore, this is pretty much a cash market, with the ratio of brokers' loans to the value of listed stocks being only around 1% vs. about 10% in 1929.

#### CONCLUSION

Today's conditions in the market are more like those of 1928, 1936 or 1945. In other words, in the years before the peaks were reached. It is to be hoped that we are wise enough to avoid the speculative excesses of those other peak years. It is our duty as analysts to warn against extremes



of either optimism or pessimism. So far, at least, the stock market is not one of the weak parts of our economy.

#### COULD THIS BE THE START OF A BEAR MARKET?

Three conditions are generally present before large bear markets start. They are:

1. The expectation by shrewd people of a future decline in business activity, earnings and dividends.
2. Excessive valuation of earnings with prices selling at 16 to 20 times earnings. (Today 13.6 times.) Yields have dropped to  $3\frac{1}{4}\%$ - $3\frac{1}{2}\%$  at other peaks. (Today they are 4%—or 4.8% if stock dividends are included.)
3. A period of careless speculative buying by uninformed people, especially in the lower quality shares.

All of those conditions existed in 1929 and 1937 and we had severe bear markets. In 1946 we had only the latter two conditions. Actually business activity, earnings and dividends increased during the bear market of 1946-49. As a result, the decline was small and was mostly over in four months in 1946 except in the overbought stocks of marginal companies. Today we have the threat that business may peak out next year but we have not had the other two conditions except in certain individual issues. A correction coming now would not have to be as severe as those of 1929 to 1932 or of 1937 to 1938.

#### WHERE WOULD THE MARKET GO IF IT WENT TO AN EXTREME?

Prices of stocks today are about 13.6 times earnings, whereas at the peaks of 1929-1937-1946 the average price-earnings ratio was 17.3. The industrial average would have to go up to around the 600 level therefore to be as vulnerable on the earning basis as it was at those peaks. Today the yields from cash dividends is around 4%. At the three important peaks of the past thirty years the average yields were 3.35%. To reach such a low return, the industrial average would have to rally to around 585.

Based on today's earnings and dividends, a rally into the 550-600 area would make the market vulnerable. Such a gain, even if it occurred, would be only 10% to 20% and that would be small compared with the 430% advance since 1942, the 220% gain since 1949 or even the 100% upturn since 1953. Therefore, a policy of establishing some profits on further rallies seems advisable.

#### CARELESS, UNINFORMED BUYING

Every once in a while the market indulges in a careless advance when inexperienced people become too optimistic. A good example was the market from August of 1945 to February of 1946. No thinking economist or analyst would have recommended stocks of the marginal companies that had benefitted from war orders but that were then facing the more competitive peacetime business world. Yet the stocks of such companies went up 100% in value in six months just before they started a three-year bear market.

But even if such a market should occur it would probably, as usual, be a short excursion into over-valued territory. In the past thirty years we have had seven periods when the cat and dog stocks dominated trading for periods

lasting from five to seven months. The average gain of the industrial average during those periods was 26% while the gain of the low-priced stock index was almost five times as large, or 126%. After each of these speculative periods there was a good-sized correction. In several cases a bear market was just around the corner.

It is also interesting to study the last 20% advances in bull markets, since they generally are short lived. During the eight longest bull markets of the past sixty years the last 20% advance took place in an average of slightly less than six months, and those gains were wiped out in an average of less than four months. One has to be alert when the market indulges in a speculative move.

#### WHAT ARE THE POSSIBILITIES ON THE DOWNSIDE FOR THE MARKET?

Cancellations of one third to one half of preceding gains are not unusual in bull markets. Should one third of the gains since 1949 be cancelled it would take the industrial average back to 400, while if there were a half cancellation of the advance since 1953 the average would retreat to 390.

Also useful as guides to the market are some of the interesting studies that attempt to determine a fair, or central, level for the market. Such studies are generally based on earnings, dividends, money rates and money supply. Three of them give the following figures at present:

Benjamin Graham	383
Edgar Genstein	409
Value Line	386

There are also two studies that attempt to tell where a market will sell under current conditions. They give the following figures at this time:

Charles Roos	400
Naess & Thomas	long range 450, but with an estimate that in 1957 the industrial average will fluctuate between 450 and 525.

Trend lines established through the important reaction lows also give some idea as to where a market might have to go to find support. When drawn on a percentage scale the trend for this bull market would come out between 370-410 during 1957.

Such figures are of interest to analysts and investors as a rough guide as to where home base is in the market at a given time. Investors do not like to stray too far from a trend or a fair level base any more than an advancing army likes to get too far from its supply lines.

Studies of past bull markets that have lasted for several years and that have established good trend lines show that most market fluctuations take place in an area bounded by the trend line and a level 25% to 35% above it. At the extreme peak in 1929 the market got 50% above its trend. Interestingly enough, in April of this year the market at its peak, around 520, was 50% above its trend drawn through the 1949-53 low points on percentage scale paper.

Because of the 1957 trend position a suggestion of an over-valued area again comes in the 550-600 area.

GENERAL CONCLUSIONS

This has been a long but fairly sensible bull market. Having avoided the extreme overvaluations seen at other important peaks of the past, it should not need a long drawn out or severe correction even if there is a decline or a slowing down in business activity. A likely range for the Dow Jones average in the next twelve months is 520 to 420.

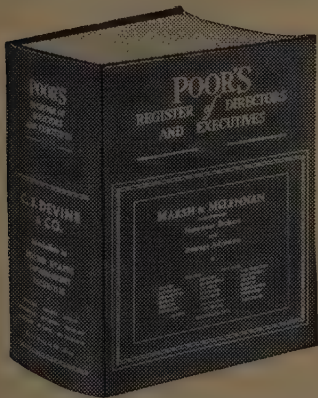
Scientific research provides good long term future possibilities and great challenges to analysts and investors in well-managed companies in scientific growth industries.

There is a danger of over-optimism if the future course of business is based on the trends of our economy over the past ten years. However, the prompt action by the Federal Reserve Board in tightening money rates may well prevent the boom and bust cycle that has plagued us in the past.

The market could be in a resting period between a completed second and a final third advancing stage. This third phase could develop if a new era psychology, based on the belief that the business cycle can be controlled, were to follow a minor and short business dip.

We are fortunate that we have not had a period of care-less buying in the lower priced shares. If we can keep the cork in the champagne bottle and the icing off the stock market cake we shall all have fewer worries tomorrow.

FLASH! Just off the Press ...  
POOR'S 1957 Register of  
Directors and Executives



Names, Addresses, Background of Business  
Executives, Officers and Directors ...

- Gives 23,000 corporate listings of nationally known companies. Shows titles and duties of all leading officers and directors, technical personnel, traffic managers, purchasing agents. Also number of employees and nature of products manufactured.
- Includes complete case histories of 80,000 top-flight executives throughout the country with their home addresses, educational background, year and place of birth, interlocking connections.
- Also includes a breakdown of 208 classifications of industry ... a products index of over 2,500 commodity and service items.
- All information is kept up-to-date through cumulative supplements. The first and only National Directory of Executive Personnel. Begun in 1928—revised yearly ever since. This 1957 edition includes over 245,000 type changes.

FOR FREE INSPECTION attach this Ad to your company letterhead and return now ... NO OBLIGATION.

STANDARD & POOR'S CORPORATION  
345 HUDSON STREET, NEW YORK 14, N. Y.  
A884-1327



AMPHENOL ELECTRONICS  
CORPORATION

At a meeting of the Board of Directors of Amphenol Electronics Corporation held today a quarterly dividend of twenty-five cents per share was declared, payable January 25, 1957, to the shareholders of record at the close of business January 11, 1957. The transfer books will not be closed.

Dated at Chicago, Nov. 27, 1956.  
FRED G. PACE  
Secretary

NATIONAL DISTILLERS

PRODUCTS  
CORPORATION



DIVIDEND NOTICE

The Board of Directors has declared a quarterly dividend of 25¢ per share on the outstanding Common Stock, payable on March 2, 1957, to stockholders of record on February 11, 1957. The transfer books will not close.

PAUL C. JAMESON  
January 24, 1957. Treasurer

Common and Preferred Dividend Notice

January 30, 1957

The Board of Directors of the Company has declared the following quarterly dividends, all payable on March 1, 1957, to stockholders of record at close of business, February 8, 1957:

<u>Security</u>	<u>Amount per Share</u>
Preferred Stock, 5.50% First Preferred Series ...	\$1.37½
Preferred Stock, 5.85% Series .....	\$1.46¼
Preferred Stock, 5.00% Series .....	\$1.25
Preferred Stock, 4.75% Convertible Series .....	\$1.18¾
Preferred Stock, 4.50% Convertible Series .....	\$1.12½
Common Stock .....	\$0.35

*W. J. Jones*  
Secretary

TEXAS EASTERN Transmission Corporation  
SHREVEPORT, LOUISIANA





Chairman

**Joseph M. Galanis**

Tucker, Anthony & R. L. Day

## CONSTRUCTION

# The Cement Industry and the New Highway Construction Program

SMITH W. STOREY

*President, General Portland Cement Company*

**T**HE FEDERAL-AID HIGHWAY ACT of 1956 seems to bring superlatives from even the most case-hardened construction industry men, and I am afraid I will be no exception. This legislation sets in motion not just the biggest highway construction program in history, nor even the biggest construction program in history but a program that is twice as big as the biggest public works project ever before undertaken in America.

The total amount to be spent on actual road construction in the next thirteen years is estimated by the United States Department of Commerce's Bureau of Public Roads to be 102 billion dollars or approximately 8 billion dollars a year. If to this are added maintenance expenditures (estimated at one billion, nine hundred million dollars for this year) total monetary outlay on roads over this period becomes nearly 110 billion dollars a year.

These figures may be surprising to you since press reports on the highway program have generally described it as a "33 billion dollar program." This 33 billion dollar figure, however, represents only the amount of Federal monies generated by the Federal-Aid Highway Act of 1956, plus the addition of state-matching funds. It by no means represents the total amount to be spent on road building in the next 13 years.

The 102 billion dollar figure was computed by the Bureau of Public Roads as follows:

The 1956 Highway Act authorizes 24.8 billion dollars to be spent on the Interstate System in the next 13 years. It also provides for 2 billion 550 million dollars for the other Federal-Aid systems for use during the three fiscal years 1957-1959. Assuming, as Congress has indicated, a slight increase in appropriations for these other Federal-Aid systems for the balance of the 13-year program, the total for them will reach about 12 billion dollars. Thus total Federal appropriations for the 13-year period will total almost 37 billion dollars.

### FUNDS TO BE SPENT

To these Federal funds must be added the money that state and local governments will spend on roads. This is estimated by the Bureau of Public Roads at currently 5 billion dollars a year. If the states continue to spend at this

rate, their outlays will be 65 billion dollars in the next 13 years.

Adding these expenditures to the Federal contribution we reach the total of 102 billion dollars to be spent for construction during the 13-year program period.

Of great importance is where and how this money will be spent.

The primary objective of the 1956 Highway Act is to bring the 41,000-mile National System of Interstate and Defense Highways up to standards adequate for the traffic of 1975. These roads are vital to our national economy and defense, so 90 per cent of their construction cost will be provided by the Federal government, and the remaining 10 per cent by funds from the various states.

Federal appropriations for the Interstate System under the 1956 Highway Act begin next year with 1 billion dollars. Appropriations will increase gradually until they reach \$2 billion 200 million in 1960. They will remain at this level through 1967, and taper off in 1968 and 1969.

On the other three Federal-Aid systems—the Primary and Secondary Systems, and Urban extensions of these systems, the 1956 Bill authorizes funds only through 1959. The combined amounts for these three systems are 825 million dollars for 1957, 850 million dollars for 1958 and 875 million dollars for 1959. It is expected that in future years, Congress will continue to increase gradually the amount for these three systems until they reach 950 million dollars a year. With such increases the total for the 13-year period for Federal-Aid Primary and Secondary Systems and their Urban extensions will be in the neighborhood of 12 billion dollars.

Money has actually been authorized only for the 13-year Interstate program and for three years on the other Federal-Aid systems. The other figures are estimates or predictions, although I feel confident they will prove to be sound.

### HIGHWAY CONSTRUCTION

The Missouri State Highway Department has the distinction of having awarded the first contract for the Interstate System under the 1956 Highway Act and that this contract is for portland cement concrete. The first actual highway construction under the new act was started by the



Kansas State Highway Department on September 26, 1956. This also is a portland cement concrete road and is expected to be open to traffic sometime in November, 1956.

#### CONCRETE DESIRABLE FOR HIGHWAY PAVEMENT

Perhaps you will permit me a few words at this point on why I think that concrete is certain to be the logical choice as the pavement type for these interstate highways to be constructed under the 1956 Act.

First, the Interstate highways must be heavy duty roads with a long service life. A memorandum issued by the Bureau of Public Roads in August, 1956 states explicitly that:

"The combined surface course, base course and subgrade of all Interstate highways shall be designed to provide adequate support for the type and volume of traffic expected in 1975."

In other words, the highways now being built must carry the traffic weights and volume of nineteen years from now.

Data in a report issued by the Highway Research Board covering the life experience of road surfaces on primary rural highways from 1900 to 1953 indicate a weighted probable average service life for concrete at 25 1/2 years. This compares with 16.8 years for the highest type of competitive payment. With recent technological advances in concrete and in construction methods, it is my belief that a modern, well-built concrete highway can be expected to have a service life of 50 years or more.

Second, while under the 1956 Highway Act, the states pay only 10% of the construction costs of Interstate roads, they must pay 100% of the cost of maintaining the roads after they have been constructed. The cost of maintenance of these roads is therefore an all-important matter to the states and a further reason why they should and, I feel, will in large part choose concrete. Records of 28 state highway departments which regularly publish maintenance costs show that the average cost of maintaining concrete pavement is very substantially less than other types.

#### ROADS TO BE BUILT EFFICIENTLY AND ECONOMICALLY

Now that the money has been made available, the states are faced with the problem of placing an unprecedented amount of work under contract and making certain that the roads are built quickly, efficiently and economically. In 1954 when the Clay Committee proposed its famous 10-year 101 billion dollar road building plan, some opponents of the program said that the work could not be completed in that time even if money were available. In response to a request from General Lucius D. Clay, the American Road Builders' Association made a comprehensive study of the nation's ability to build the roads. The ARBA in this survey and in a later one conducted in 1955 found that the program could be accomplished with little or no delay by the construction industry, by materials suppliers and by state highway departments.

This ARBA report gave estimates of the amounts of major highway materials needed for each 1 billion dollar increase in road construction over the present level. Some typical figures were: 16.6 million barrels of cement; 75

million tons of aggregates; 210,000 tons of structural steel; 18 million pounds of explosives.

Shortly after the highway program became law, the Bureau of Public Roads released an estimate of materials needs for all road building during the 13-year program. According to these figures, which agree with those of the ARBA, at the peak of the program 442,000 men will be employed directly on highway construction; 110 million barrels of cement per year will be used in road building; 3,886,000 tons of steel; 10 million tons of bituminous material; 574 million board feet of lumber; and over a billion gallons of petroleum products will be needed each peak year for road construction.

An idea of what this means to the cement industry can be gained from the fact that more cement will be used for roads in 1960 than was produced for all purposes in 1945. The total amount of cement needed for all 13 years of the program is estimated at 1.4 billion barrels.

The highway program will have a similar impact on other materials suppliers and on the construction equipment industry. In fact, road building equipment sales are expected to increase as much as 200 per cent by the peak of the program.

The secondary effects of the program will also be great. Certainly a 3 billion dollar a year increase in public works expenditures will be a major stimulus to the economy. But an even greater spur will be provided by completion of the roads. There has been ample proof in the past of the power of good roads to accelerate decentralization of industry and population movements to the suburbs.

All of these indirect benefits are of importance in assessing the impact of the highway program on the cement industry; but, they are difficult to forecast precisely. We can, however, predict fairly accurately the direct requirements of the program. It is important to remember that the heavy cement demands of the highway program will come on top of a construction boom in which a new all-time record for cement production has been set each year for nine consecutive years. The year 1956 should be the tenth.

Production for 1956 is estimated to be about 320 million barrels this year. Capacity will probably reach 365 million to 370 million barrels by the end of the year. By the end of 1958 capacity will be pushing close to 400 million barrels a year, according to the Bureau of Mines, a 25 per cent rise in three years. According to published expansion plans, nearly 60 million barrels of capacity has been or will be added this year.

The total increase in capacity foreseen for the decade 1950-1960 is more than 40 per cent; this growth record is unmatched in heavy industry.

Production has skyrocketed since the end of World War II and is now more than triple that of 1945. The value of cement sales will probably be around the 1 billion dollar mark this year.

#### PROPOSED CONSTRUCTION

Although highways are the most spectacular part of the construction picture today, they represent only a good fraction of the enormous backlog of needed construction. Pro-

posed construction on which plans are underway but on which contracts have not yet been let exceeds 100 billion dollars. The great majority of this can be expected to be built in the next 3 or 4 years. This year, despite a 10 per cent drop in home building, new construction is being put in place at an annual rate of 1 1/2 billion dollars over last year. Despite the drop in residential building, the complaints about high interest rates and the tight money supply, construction continues to set records. It seems to me that this indicates the fundamental soundness of the current construction level and suggests a continued strong demand for products of the construction industry for many years to come.

A recent authoritative survey points out that there are nearly 10 million substandard urban dwelling units in the United States, constituting some 30 per cent of all urban housing. I believe that with continuing prosperity, and the increasing scarcity of suburban land, we will see urban redevelopment programs dwarfing those of the past, and making a real dent in the ugly slums that disfigure our cities.

Conservationists estimate that a capital outlay of between 6 1/2 and 7 billion dollars is needed in the next 20 years for a well-rounded soil conservation program.

In river valley development, expenditures of 1 billion, 700 million dollars a year are needed almost indefinitely for waterways, port development, flood control, power, water supply and pollution control.

The White House Conference on Education this year reported that 470,000 new classrooms are needed in the next three years. The present rate of construction will provide only 150,000. I believe we can expect some kind of Federal action on this problem within the next few years.

#### A BACKLOG

In all these areas, there is a pressing need for public construction that provides a strong back-up to the present high level of private construction. Much of this public construction can be expected to go forward in the near future, but much of it may also wisely be kept in reserve to cover the possibility that heavy public works expenditures may be needed to counteract a future temporary recession.

I have dwelt for some time on construction needs as a whole because this, rather than the highway program alone,

is what has led to the vast expansion program now under way in the cement industry. The industry's expansion has not received big headlines because it is the result of many separate plans by many companies. It is fortunate that this expansion was undertaken before the highway program was enacted, because of the heavy new demand for cement the program will create. But even without the highway program, the increase in cement demand has been phenomenal. For example, national per capita consumption has risen 50 per cent in 9 years and is still going up.

The industry's productive capacity now in operation, with projected expansion, will not only meet all foreseeable demands but will actually provide some over-capacity in the years immediately ahead. Men of the cement industry can be depended upon to provide for all of the cement requirements of our country. There is a very great restraining influence against undesirable over-capacity. This is the extremely high cost of cement manufacturing facilities which though it varies with conditions, has been estimated as high as \$12.00 per barrel of annual capacity.

#### COSTS OF PRODUCTION

This very high cost of new facilities and the ever-increasing current costs of production, have had and may continue to have an effect upon cement prices. The price of cement has risen only 83% since 1939 against a 170% increase in the price of all building materials. In other words, cement prices have increased by only half that of other building materials.

In summary, then it appears that the demand for cement should continue at a high level in the years ahead, assuming of course that our country does not become involved in a major war. The highway program's requirements should build up to about 50 million barrels a year more than is presently used for roads. The need of cement for other classes of construction can be expected to continue to be very great. The cement industry is fulfilling its obligation to supply adequately all of our nation's need for cement and moreover it will provide the desirable reserve capacity. With these prospects and with a realistic relationship between the cost of production of cement and the extremely high cost of new plants on the one hand, and the prices of the products of the cement industry on the other, the industry will continue vigorous and strong.

### MINNEAPOLIS GAS COMPANY

739 Marquette Avenue  
Minneapolis 2, Minnesota

#### Common Stock Dividend

The Board of Directors of Minneapolis Gas Company, at a meeting held on January 10, 1957, declared a dividend of 35 cents per share payable in cash on February 8, 1957, to common stockholders of record as of the close of business January 25, 1957.

H. K. WRENCH, President

#### Dividend Notice

### JEFFERSON LAKE SULPHUR COMPANY

The Board of Directors, at a meeting held on January 28, 1957, declared the regular semi-annual dividend of 35c per share on the Preferred shares and the regular quarterly dividend (No. 55) of 40c per share on the Common shares, both payable March 11, 1957, to shareholders of record February 21, 1957.

CHAS. J. FERRY  
Vice-President &  
Secretary

### Interchemical CORPORATION



#### DIVIDEND NOTICE

Interchemical has declared—

- The regular quarterly dividend of \$1.12½ a share on its Preferred Shares.
- A dividend of 65¢ a share on its Common Shares.

payable February 1, 1957, to holders of record at the close of business on January 16, 1957.

KENNETH B. LANE, Secretary





It's a good thing when customers—like eggs—are in more than one basket. Markets are broader; sales are steadier.

Armco customers are in *many* baskets. The reason is that Armco makes many kinds of special steel and steel products: stainless steel, steel with aluminum or zinc coatings, special electrical steels, and steel products like buildings and drainage pipe.

This broad group of products attracts a wide range of prospects. And the different types of prospects are influenced by widely varying patterns of demand. So Armco sales are more evenly distributed throughout the year—and from one year to the next.

Diversification is a major factor in the expanding market for Armco steels and products. It has been important to our steady growth.

**ARMCO STEEL CORPORATION**

MIDDLETOWN, OHIO



SHEFFIELD STEEL DIVISION • ARMCO DRAINAGE & METAL PRODUCTS, INC. • THE ARMCO INTERNATIONAL CORPORATION

## NON-FERROUS METALS

# Titanium Advances Toward Industrial Maturity

JOSEPH A. MARTINO

*President, National Lead Company*

**T**HE SAGA OF TITANIUM HAS THE elements of real industrial drama. Our company has the word "lead" in its name as one of its many heritages, but, today, the word "titanium" figures far more prominently in many of our operations. As a matter of fact, the multiplicity of divisions and corporations within National Lead concerned with titanium often confuses the letter writer.

Up to a few years ago, the word "titanium" in National Lead conversation applied to titanium dioxide, or pigment. The TAM Division was usually more precise in its terminology, and called its products by their correct name of "ferro-titanium" and "titanium carbide."

Now that titanium metal has sprinted from a laboratory oddity to a prominent engineering metal, all in the short space of less than six years, the single word quite rightly belongs to the metal.

All of National Lead Company's activities involving the metal titanium, and related products, are concentrated within Titanium Metals Corporation of America. National Lead Company owns one-half of TMCA. The other half is owned by Allegheny Ludlum Steel Corporation, which also placed all of its titanium metal activities within the TMCA framework, when that Corporation officially became operative in March of 1950.

One-half ownership in such a prominent activity is somewhat unusual for National Lead Company, and it is equally unusual for Allegheny Ludlum Steel Corporation. Certainly, the pooling of the two groups of skilled technicians, one with a history of chemical processing and the other of metallurgy and metal processing, has been highly beneficial. Much of the success of Titanium Metals Corporation of America can be ascribed to this cooperative venture. TMCA was the first such joint venture in the titanium industry, and of the three other companies now actively selling mill products, two of them are similar joint ventures of companies with complementary skills.

### TITANIUM FIVE YEAR GROWTH

Titanium sprang from the laboratory bench about five years ago. In 1950 only about 50 tons of titanium sponge was produced, of a quality intolerable today. In each of the following years, production just about doubled that of the previous year. And, such is the steep pitch of such a geometric progression that in this year of 1956 total industry

production of sponge may approach 15,000 tons. For 1957, a further doubling to 30,000 tons could be supported by estimates of market demands, but actual output probably will not reach that figure. There just comes a point in any such geometric progression where doubling and redoubling imposes severe strain on technical manpower and available money.

In 1950, TMCA had one employee, today it has over 1000 direct employees, and many more indirectly working in the fabrication of titanium products. In 1950, TMCA—or more rightly its two parent companies—committed \$15,000,000 to the titanium venture. In the one year of 1956, TMCA will have committed somewhere between \$20,000,000 and \$25,000,000 on production and allied facilities.

Not always has the titanium industry seemed so promising as it is today. This metal is highly corrosion-resistant, it is potentially capable of strengths exceeding heat-treated alloy steel, and its weight is barely half that of steel. Further, there is considerable evidence that it can operate at high stress levels at temperatures up to 1000 degrees Fahrenheit. Here is a metal without peer for the new age of gas turbines, near sonic and supersonic flight, high-performance aircraft, ballistic missiles, the corrosive environment of atomic installations, and the multiplicity of extreme corrosive conditions which characterize today's chemical processing industry. To the technical man and the military planner must go the credit for much of the early enthusiasm and push of the titanium development.

At the outset titanium defied any orderly market analysis by conventional methods. In fact, those companies that attempted such analysis were probably so depressed by the results as to shy away from a commitment. In industry, and certainly in the metal industry, there are two schools of thought about any new development. A few of the more adventuresome dive in early, hoping thereby to gain initial advantage. Others prefer to wait some years and come in after most of the bloody noses are no longer dripping.

Our associates in Allegheny Ludlum have a history of early entry into new products, and I believe that National Lead also is known for its prompt and energetic exploration of new fields of activity.

So, the two of us kindled to the enthusiasms of our technical groups, and we stepped off with the first integrated titanium activity. Our interests spread from ore to finished



mill product. In fact, we are still the only company involved in the recycling of all by-products, one phase of which makes TMCA the second largest producer of magnesium in the United States, every pound of which is constantly re-used within the titanium production cycle.

By the end of 1957, TMCA will not only be the country's second largest producer of magnesium but will likely be the world's second largest producer as it recycles an even greater quantity of this metal to produce 9,000 tons of titanium sponge per year.

We realize that security in the non-military field depends on prices considerably lower than those prevailing today, and we are bending every effort to progressively reduce prices. TMCA has, and is, devoting great sums of money and much technical skill to perfect other means of basic extraction, electrolytic for instance. But, at the outset, and also today, we have the opinion that the somewhat disdained Kroll method of reduction enjoys long-term capability of turning out the very highest quality of metal at quite low cost.

To summarize, we believe the titanium industry to be well along its steep trend line of development. However, it is now, and for several years will remain, in a ferment of evolution and expansion, which should greatly broaden its technical base and open the way into areas of cost and customer pricing certain to attract an increasing number of non-military applications.

#### PRICE ACTIONS

The industry has established an enviable reputation for price actions, particularly striking in that all such reductions were made when visible supplies of metal were sold for many months ahead, with resultant lack of customer pressure. In the basic sponge, the price hung at its original \$5 per pound level up through the early part of 1954. Then, on April 1, duPont dropped the price to \$4.72, and, in

December of the same year, further reduced the price to \$4.50. On April 1, 1955, TMCA chewed off 55 cents per pound, thereby establishing a new price of \$3.95, and on November 1, 1955, duPont dropped 20 cents further to \$3.75, and barely three weeks later TMCA cut 30 cents more to make a price of \$3.45 per pound. Then on May 15, 1956, TMCA went down 20 cents to a new price of \$3.25, and in mid-1956 duPont went down to \$3.00 per pound.

This 40 per cent reduction in sponge price within a space of two years is a steeply pitched downward trend line with few, if any, parallels in the metals industry. You may note that duPont initiated four of the declines, whereas TMCA initiated three, although the total of TMCA reductions was the larger.

Since mill products are further along the production cycle than sponge, it is only to be expected that changes in the price of mill products will lag behind changes in the price of sponge. In February, 1954, TMCA announced some scattered price declines for certain mill products, and on April 1, 1955, declines of from \$1 to \$3 per pound were announced. On November 23, 1955, further cuts of ranging from 60 cents to \$3.00 per pound were made, and in May, 1956, various mill products went down 6 per cent more. All of these reductions were initiated by TMCA.

All this price action is the result of the first upward surge of the titanium industry, from laboratory to routine production of rather sizeable quantities of metal. But, now, the industry is moving into a second stage of development, with total production capabilities moving to far higher levels along paths of greater efficiency, and with processing of the metal shifting onto equipment specifically designed for titanium. This latter trend will certainly have dramatic effects on the quality of products and on recovery, and all this will in the future assure even more widespread usage of the metal and should reflect in continuation of the downward price trend.

The very large, very efficient and very precise consumable-electrode vacuum-melting ingot furnaces developed by Allegheny Ludlum for melting titanium are already being adopted by the steel industry for melting premium alloys. I venture to say that the extensive and unique vacuum-annealing and vacuum-degassing furnaces devised and regularly used by the titanium industry will find equal favor with other sections of the metals industry in the near future. On January 10, 1956, TMCA purchased a \$3,000,000 Sendzimir reversing cluster mill for the cold rolling of continuous bands of titanium sheet in widths up to 49 inches. This is the first such mill to be altered to accommodate the peculiarities of titanium, and its operation in a few more months will assure wide, thin and close-tolerance sheets for use in the airframe industry.

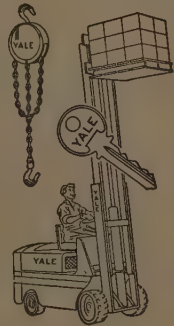
#### NEW MACHINES & PROCESSES

The entire industry is in the initial stages of developing the metallurgy and production techniques for heat-treated alloy sheet, of strength levels far above anything produced in the past, and in sizes and gages not obtainable even in steel today. Many new machines and processes have been and are being piloted. Special heating furnaces, different

## YALE & TOWNE

### Declares 276th Dividend

### 37½¢ a Share



On Jan. 24, 1957, dividend No. 276 of thirty-seven and one-half cents per share was declared by the Board of Directors out of past earnings, payable on April 1, 1957, to stockholders of record at the close of business Mar. 14, 1957.

**F. DUNNING**  
Executive Vice-President and Secretary

**THE YALE & TOWNE MANUFACTURING CO.**  
Cash dividends paid in every year since 1899

rolling procedures, hitherto unknown rigs for heat-treatment of very large sheet and special flattening devices, are all passing through the prototype stage into full-scale production machines. Here again the titanium industry will end up with procedures and equipment which will be borrowed in whole or part by the metal industry in general.

To speed this trend in alloy sheet, Titanium Metals Corporation of America only recently purchased an entire plant at Toronto, Ohio. Engineering is well along to convert this plant to a model titanium processing facility, first for alloy sheet and forgings, and later to accommodate many titanium products not now being produced or being produced only on a small scale.

TMCA has always been integrated—ingots from its own facility at Henderson, Nevada, are converted to mill products in one of its parent's plants. Now TMCA is further refining this integration by establishment of the first finishing facility devoted exclusively to processing titanium into mill products. It is likely that a similar trend will be evident elsewhere in the industry in the near future.

The problems of sponge quality, which were so often major points of troubled discussion only two short years ago, are now so well in hand as to be completely ignored in technical and industrial meetings. Today, titanium is being machined and ground in large quantities, without comment, and often more easily and efficiently than steels of comparable strength levels. Welding, which a couple of years ago seemed almost impossible, is today well along toward

being routine. Large-scale recycling of home and customer scrap is now commonplace, whereas in late 1954 many industry authorities doubted whether the problem could ever be conquered. The general quality of mill products is now often without peer in the metals industry.

#### TITANIUM IN DEFENSE EFFORTS

The titanium industry is very proud of this record. It has materially helped our country's defense effort, and definitely accelerated the design of aircraft and ballistic missiles having performance criteria even exceeding those machines pictured in comic strips. Possibly all this has been better expressed by the Office of the Assistant Secretary of Defense, who stated "We believe that the successful development and engineering application of titanium in this country will represent a major technological break-through. It opens up the possibility of military designs, with performance characteristics that would be impossible to attainment with other known materials, and could have an important bearing on the outcome of our technological race."

Beyond the immediate military need lies the broad non-military base which is the titanium industry's target for tomorrow. Excluding civilian aircraft, only a small part of current titanium output goes into civilian consumption. However, this non-military market is being explored with energy, many test runs and prototypes are being made, and as prices move downward more and more of these markets will require progressive increases in titanium capacity.



### INTERNATIONAL HARVESTER COMPANY

The Directors of International Harvester Company have declared quarterly dividend No. 153 of one dollar and seventy-five cents (\$1.75) per share on the preferred stock payable December 1, 1956, to stockholders of record at the close of business on November 5, 1956.

GERARD J. EGER, Secretary

### PUGET SOUND POWER & LIGHT COMPANY



#### Common Stock Dividend No. 54

The Board of Directors has declared a dividend of 84c per share on Common Stock of Puget Sound Power & Light Company, payable February 16, 1957, to stockholders of record at the close of business January 24, 1957.

FRANK McLAUGHLIN  
President

### A regular quarterly dividend

of 30c per share has been declared by Daystrom, Inc. Checks will be mailed February 15th to shareholders of record January 25th.



**DAYSTROM, Inc.**

Elizabeth, N. J.

Electrical and  
electronic products  
Modern furniture



### COMMON STOCK DIVIDEND

The Board of Directors of Central and South West Corporation at its meeting held on January 21, 1957, declared a regular quarterly dividend of forty cents (40c) per share on the Corporation's Common Stock. This dividend is payable February 28, 1957, to stockholders of record January 31, 1957.

LEROY J. SCHEUERMAN,  
Secretary

**CENTRAL AND SOUTH WEST  
CORPORATION**  
Wilmington, Delaware

## Dennison

MANUFACTURING COMPANY  
Framingham, Mass.

### DIVIDEND NOTICES

**"A" Common and Voting Common:** A quarterly dividend of 40 cents per share on the "A" Common and Voting Common Stocks will be paid March 4, 1957, to stockholders of record February 4, 1957.

**Debenture:** The regular quarterly dividend of \$2.00 per share on the Debenture Stock will be paid March 4, 1957, to stockholders of record February 4, 1957.

R. N. Wallis, Treasurer

113TH YEAR



### SOCONY MOBIL OIL COMPANY INC.

#### Dividend No. 184

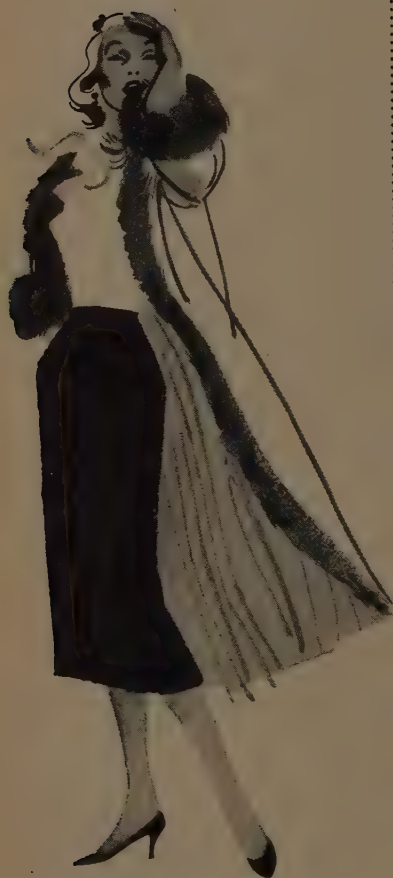
The Board of Directors on January 15, 1957, declared a quarterly dividend of 50¢ per share on the outstanding capital stock of this Company, payable March 9, 1957, to stockholders of record at the close of business January 30, 1957.

A. M. SHERWOOD, Secretary

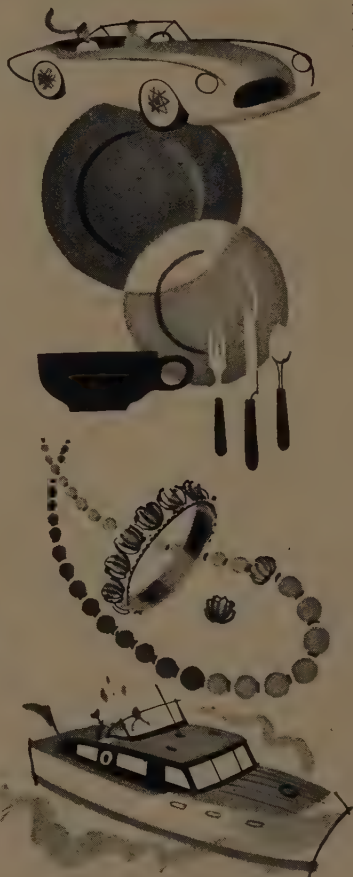


# Cyanamid Means ...

## *Better Textiles*



## *Better Plastics*



## *Better Drugs and Pharmaceuticals*



■ These are just a few of the many products Cyanamid is helping to improve through chemical research and the application of chemicals. Among others are—Metals... Food ... Paper ... Rubber ... Leather ... Agricultural Chemicals ... Petroleum ... Surface Coatings ... Explosives. For further information, call or write AMERICAN CYANAMID COMPANY, 30 Rockefeller Plaza, New York 20, N. Y.

**CYANAMID**

HELPING AMERICA MAKE BETTER USE OF ITS RESOURCES



# Current Trends in the Petroleum Industry

SERGE JURENEV

*Assistant to President, Continental Oil Co.*

**A**RE THE OIL STOCKS STILL a good investment despite the clouds which have recently appeared on the oil industry's horizon? Basic elements of strength inherent in the oil industry and which a few scattered clouds will not affect are: (1) The indispensable nature of the oil industry to our economy and national defense; (2) the steady growth factor which is characteristic of the demand for petroleum and its products; (3) the industry's size and financial strength; and, what is quite important, (4) the enlightened and progressive management which the industry possesses.

The indispensable nature of the industry stems from the fact that it is a producer of energy fuels. The basic goal of modern society is the continuing advancement of the standard of living. A high standard of living is essentially the result of a high per capita flow of goods and services and a high per capita consumption of raw materials. The availability of raw materials in itself is primarily a function of an ample supply of cheap energy. Moreover, the conversion of raw materials into goods which modern society requires and the transportation of such goods to points of consumption cannot be accomplished without the use of energy. The most complex piece of machinery in the mining, manufacturing or transportation fields is nothing more than an intelligent array of inert metal. Energy gives it life and productivity. It is not surprising, therefore, that energy consumption in the United States has approximately doubled in the past twenty years. There seems to be a general agreement that it may well double again in the next two decades.

### COAL IN 1928

In 1928 coal supplied roughly two-thirds of total energy requirements and petroleum (oil and natural gas) the remaining one-third. By 1946 a fifty-fifty ratio between coal and petroleum was reached. By 1955 the ratio which existed in 1928 was reversed: petroleum supplied two-thirds of total energy requirements (43.9% for oil and 23.1% for natural gas) and coal supplied the remaining one-third. I should like to note in passing that in 1955 the value of oil, natural gas liquids and natural gas at points of production amounted to \$8.5 billion and exceeded the aggregate value of all other metals and minerals produced in the United States.

An industry that is called upon to supply two-thirds of

the nation's energy requirements must be big, and indeed it is. In the size of total assets the petroleum industry is exceeded only by agriculture and the combined public utility industry (electricity, gas and communications). Its gross investment in property, plant and equipment in the United States at the end of 1955 was \$40 billion, of which \$24 billion was invested in production. The domestic capital expenditures of the industry in 1955 amounted to \$5.6 billion and were equivalent to 19.5% of capital expenditures for plant and equipment of all industries in the United States.

### OIL EQUITIES OF TODAY

Oil equities constitute a large proportion of all stocks traded on the New York Stock Exchange. As of June 30, 1956, common stocks of 50 oil and natural gas companies listed on the Big Board had a market value of \$41.2 billion and represented 20.0% of the aggregate market value of all domestic common stocks listed. In market value, oil and natural gas common stocks represented the largest single group of securities listed.

Oil stocks have been generally more popular with large individual investors, institutional investors and investment trusts than their 20% ratio to total common stocks listed on the New York Stock Exchange indicates. On June 30, 1956, ten leading investment trusts, with a market value of common stock portfolios aggregating \$3.4 billion, had 23% of their investment in oil securities. This large investment in oils is not merely attributable to the size of the oil industry; it is basically a reflection of the investors' faith in the indispensability of petroleum to the nation's economy, in the industry's future growth, and in the ability and integrity of the industry's management. The attractiveness of oil stocks has been enhanced by the fact that the essential nature of the oil industry has been recognized by Congress through differential tax treatment in the form of percentage depletion and option to write off against current earnings intangible development costs incurred in drilling all wells. I have advisedly used the word "differential" and not "preferential" because tax incentives in one form or another are granted in many other instances outside of the oil industry. Percentage depletion in varying amounts is common to most extractive industries and the treatment of intangibles is similar to accelerated depreciation granted under certificates of necessity. More recently the essential



nature of the industry to national defense has been recognized by the O.D.M. and the Presidential Advisory Committee on Energy Supply and Resources Policy in connection with a growing volume of imports of foreign crude. The point I am trying to make is that the importance of the oil industry to our economy and national defense is of such magnitude that it is bound to affect public and legislative thinking in the formulation of national policies.

The petroleum industry reached its present size and importance through steady growth at a rate which was more rapid than the over-all growth in energy requirements. While total demand for energy doubled in about 20 years, demand for petroleum doubled in eleven years. The Supply and Demand Committee of the Independent Petroleum Association of America, which met in Dallas late in October, estimated that domestic demand for crude and refined products in 1956 would aggregate 8.9 million b/d and will be 5.9% above 1955. Demand for 1957 is forecast by the same committee at 9.3 million b/d, 4.6% above 1956.

#### FUTURE PETROLEUM DEMAND

Estimates as to how large United States petroleum demand will be in the next five or ten years differ considerably. Nevertheless, the following observations can be made: (1) Demand for energy will grow with the expansion in our economy, the dynamic nature of which seems reasonably assured; (2) there is no substitute for petroleum for propulsion fuels, which accounts for over 55% of petroleum demand; (3) use of atomic energy for propulsion, except for military uses, is still a long way off. Any inroads of atomic energy in the civilian segment of the economy will be primarily centered in the generation of electric power by public utilities. Since only about 2.5% of petroleum consumption in volume (and considerably less in value) goes into this field, the effect of the use of atomic energy will be negligible; and (4) petrochemical uses of petroleum are expanding rapidly and are a source of substantial earnings.

#### PETROCHEMICALS

The petrochemical end of the industry deserves special mention because of its potentialities. The United States Tariff Commission (Chemical Division) published in June 1956 a compilation on volumes and values of sales of crude products from petroleum and natural gas for chemical conversion. This compilation covers the year 1955 and shows that such sales aggregated 10.4 billion pounds and had a value of \$361.5 million. A rough calculation indicates that this volume, converted to barrels, was equivalent to about 1.5% of domestic crude production. In value, the sales of these materials were equivalent to as much as 5% of the value of crude at the well-head.

Despite these factors, there are disquieting trends which deserve mention: (1) Present over-accumulation of gasoline inventories; (2) rising imports of crude oil, which have put an effective ceiling on domestic crude prices; (3) rising costs of finding and developing new production, which so far have not been compensated by higher prices.

Imbalance in inventories is probably of least importance

from the long-range viewpoint. It is not an indication of slackening in demand and has little relationship to the conditions of the economy as a whole, at least at the present time. Overaccumulation of gasoline was caused by (a) an increase in refinery runs to mid-September of 7% while demand was up 5%; and (b) lack of recognition by the industry of the fact that seasonally total demand for all products declined 15% from January to May 1956, while back in 1946 the seasonal decline was only 2%. The high point in gasoline inventories in relation to the year ago level, present inventories, and inventory levels projected by the Supply and Demand Committee of the IPAA for the end of the year and March 31, 1957 (the end of the heating season), are shown below:

	<i>Highest excess of gasoline inventories over last year (September 21)</i>	<i>Current inventories (Oct. 26)</i>	<i>(IPAA estimates)</i>	
			<i>End of Year</i>	<i>March 31</i>
Millions of barrels	176.9	172.0	183.9	210.0
Excess over previous year				
Millions of barrels	25.1	20.4	18.5	10.3
Per cent	16.6	13.4	11.2	5.2

Refinery runs reached their peak of 8,187,000 b/d for the week ended September 7. Following numerous announcements of proposed reductions in runs by leading oil companies, refinery runs are now at a level of 7,670,000 b/d. The cut from the peak to date thus was 517,000 b/d. If IPAA estimates on gasoline inventories are to be achieved, runs during the fourth quarter should average 7,922,000 b/d. and during the first quarter of 1957 8,262,000 b/d.

#### IMPORTS

Effects of increasing imports on the domestic industry is of a more lasting nature than the inventory imbalance. In 1946, crude oil imports to the United States amounted to 236,000 barrels daily and represented about 5% of our domestic production. By 1954, however, crude oil imports had grown to 656,000 barrels daily, an increase of 178%, and represented 10.34% of domestic crude oil production.

National concern over the steadily growing volume of crude oil imports contributed to passage of the Defense Amendment to the Trade Agreements Act of 1955. This amendment authorized the President to limit imports of any commodity whenever they reached such a level that our national security was endangered. In February, 1955, the Presidential Advisory Committee on Energy Supply and Resources Policy recommended that petroleum imports should not exceed significantly the relationship which they bore to domestic production in 1954 and that control should be on a voluntary basis. This became the national policy, and the director of O.D.M. was vested with the responsibility for seeing that the policy was carried out.

Crude imports for the year 1956 are estimated by O.D.M. at 971,000 b/d, which is equivalent to 13.64% of domestic production. The latter is estimated at 7,118,000 b/d. The O.D.M. estimates for 1956 compare as follows with the limits set by the original Cabinet Committee formula:

Source of imports	Imports for 1956		Limits set by formula	
	Barrels daily	Per cent of domestic production	Per cent of domestic production	Excess over formula limits, barrels daily
Canada	118,000	1.66	.11	110,000
Venezuela	445,000	6.25	5.55	50,000
Other areas	408,000	5.73	4.68	75,000
Total	971,000	13.64	10.34	235,000

Under the present interpretation of the formula, Canada and Venezuela are exempt from voluntary controls. Consequently, it is only the excess from other areas, which does not move to the Pacific Coast, that is subject to reduction. At the present time approximately 275,000 b/d of Middle Eastern crude move to the Atlantic seaboard and around 50,000 b/d to the Pacific Coast. With the present crisis in the Middle East, most, if not all, of the movements of Middle Eastern crude to the Eastern seaboard may be interrupted.

There is no statistical support to the contention that the domestic industry has been seriously affected by imports. There has been no slackening in drilling activity—44,016 wells were completed during the nine months of 1956, as compared with 42,581 completions during the corresponding period of 1955, an increase of 3.4%. The earnings of 24 major oil companies which published their interim reports to the date of this writing were up 13.7% for the third quarter of 1956, as compared with the corresponding quarter of 1955. For the nine months period the increase in earnings amounted to 16.3%.

In recent months the pressure exerted on the domestic crude oil markets by growing imports of low-cost foreign oil has been an important factor in deferring crude oil price advances in this country. There has been only one general increase in the price of crude oil in the last nine years—a 10% increase in the wellhead price in June 1953. Since that time, crude oil producers have faced sharply rising costs in all phases of their operations. The problem of rising costs has been particularly acute during the last year because prices of industrial commodities, other than oil, have resumed an upward trend. In addition, domestic producers have faced added expenses associated with deeper drilling and the steadily increasing difficulty of locating new oil reserves.

From a long-range viewpoint, certain producers are, in

fact, liquidating their existing crude oil reserves at prices which reflect the lower finding costs of earlier years rather than today's costs. If their operations are to be continued on a healthy basis, due recognition through price advances must be given to increased costs and expenses. This does not mean that the more efficient units in the industry are near a point where their replacement costs approach the prices which they realize on sales of crude produced by them. The degree of success in finding new reserves and the costs of finding such reserves vary widely within the industry.

But what of the future? Will crude prices remain rigid and will rising replacement costs reach a point where the industry will not be able to make a profit?

According to the Chase Manhattan Bank, the 34 major oil companies at the end of 1955 had a gross investment in the United States of \$28.4 billion and a gross investment abroad of \$4.8 billion. Thus, the ratio between domestic and foreign investment was about 6 to 1. Capital expenditures by these companies for 1955 amounted to \$3.2 billion in the United States and to \$668 million abroad. The portion of capital expenditures applicable to finding and developing new production in the United States was \$2.0 billion. Expenditures for this purpose abroad were under \$400 million, or less than one-fifth of domestic expenditures.

In the light of these figures, it does not appear that the management of the United States companies which operate on a world-wide basis is losing faith in the future of the domestic oil industry. I doubt that under the voluntary restriction scheme imports will be deliberately increased to a point where the health and vigor of the domestic industry will be seriously impaired and the very large United States investment of the importing companies jeopardized. In the unlikely event that this should happen, the national security of this country would be seriously affected. This unavoidably will lead to the iron fist of Government control replacing the soft-handed referee.

To sum up, let me say that the present situation in the oil industry calls for a greater degree of selectivity on the part of investors in acquiring oil equities. But, by all means, do not sell short stocks of oil companies which have dynamic and able management and a great potential. A few scattered clouds on the oil industry's horizon do not affect their inherent strength and long-term attractiveness.

## AIR REDUCTION

Company Incorporated



159th CONSECUTIVE

### COMMON STOCK DIVIDEND

The Board of Directors has declared a regular quarterly dividend of 50¢ per share on the Common Stock of the Company, payable on March 5, 1957 to holders of record on February 18, 1957, and the twenty-first regular quarterly dividend of \$1.125 per share on the 4.50% Cumulative Preferred Stock, 1951 Series, of the Company, payable on March 5, 1957 to holders of record on February 18, 1957.

January 23, 1957

T. S. O'BRIEN, Secretary

## Dividend No. 50

Interlake Iron Corporation has declared a dividend of 95 cents per share on its common stock payable December 15, 1956, to stockholders of record at the close of business December 1, 1956.



*J. P. Dagen*  
Exec. Vice Pres. & Treas.

## Interlake Iron

CORPORATION

CLEVELAND, OHIO

Blast Furnace Plants in Chicago, Duluth, Erie, Toledo



## THE DAYTON POWER AND LIGHT COMPANY

DAYTON, OHIO

### 138th Common Dividend

The Board of Directors has declared a regular quarterly dividend of 60¢ per share on the Common Stock of the Company, payable on March 1, 1957 to stockholders of record at the close of business on February 8, 1957.

GEORGE SELLERS, Secretary

January 15, 1957



# Foreign Financial Operations of American Oil Companies

EMILIO G. COLLADO

*Treasurer, Standard Oil Company (New Jersey)*

TWENTY YEARS AGO THE ENTIRE production and consumption of oil in the free world was 4.3 million bbls./day. This year the free world's requirements amount to over 15.5 million bbls./day, and it is expected that in another twenty years this large figure may double. While the United States is expected this year to consume 8.9 million bbls./day, or 57% of this total, the rate of increase at home is only about one-half the foreign rate of increase. Since 1950 free world foreign demand has risen from 3.5 million bbls./day to 6.7 million bbls./day, or an increase of 88%, whereas United States demand has climbed only 36%. While the rate of increase outside the United States is generally considerably greater than in the United States, in certain areas, such as Free Europe and also the Far East, expansion in consumption is astonishing. In Europe, consumption of petroleum products increased from 1.3 million bbls./day to 2.8 million bbls./day, or 118% between 1950 and 1956, and a further 4.2 million bbls./day increase is projected over the next twenty years. The supply of coal, which has been the traditional and predominant energy source for Europe, will not be able to keep abreast of expanding requirements, and oil, especially heavy fuel oil, will have to be relied upon to make up most of the increase during the next twenty years in energy requirements. The expected expansion of demand in Western Europe over the next twenty years is the equivalent of doubling present Middle East production.

In Latin America it is expected that consumption will almost triple over the next twenty years to a total of 3.2 million bbls./day; the increase of over 2 million bbls./day is about equal to Venezuela's entire present crude production.

These few figures, and a great many more which could be mentioned, underscore the very rapid growth in foreign oil demand, and suggest that within a few years demand outside of the United States will equal that in the United States. On the side of supply, this year, production of crude outside of the United States is actually slightly surpassing production within our country.

These increases in foreign demand obviously require tremendous amounts of capital investment in production, in refining, in transportation, and in marketing. A large portion of this capital investment has been made by American companies, and foreign oil operations are now attracting many American oil investors who have in the past not ventured far beyond the boundaries of the United States.

Let us look briefly at the amounts of money involved in capital investments in the petroleum industry outside the United States. According to a Chase Manhattan study of last February, the free world petroleum industry spent \$2.6 billion in capital expenditures outside the United States in 1955. Looking forward in the next five-year period the industry will spend \$17 billion in capital expenditures out-

side the United States and that in the next ten years the figure will be \$41 billion.

A sizeable part of the investment in petroleum facilities outside the United States has been and will continue to be made by American companies. Unfortunately, the Commerce Department's figures on foreign investment do not give us any indication of gross investment abroad as yet, although we understand they are trying to correct this, but perhaps looking at Jersey Standard's figures will give some idea of the order of magnitude. Jersey Standard in 1956 accounts for about 25% of all free world petroleum operations outside of the United States, whether you look at sales, production, or refining. This year Jersey expects to spend outside of the United States, searching for and developing new reserves of crude oil and building the necessary refining, transportation, marketing, and research facilities \$725 million, including Jersey's share of non-consolidated companies, mostly in the Middle and Far East; and within the United States, \$475 million.

From whence will come this money? Obviously a very great deal from the cash earnings of the companies already engaged in this expanding business. The Chase study estimated that 90% of the funds available for investment in the free world, that is at home and abroad, will come from cash earnings; that is, retained earnings after dividends, plus accruals on account of depletion, depreciation, amortization, and retirements. We are all familiar with the process of reinvestment in the oil industry in the United States, and the influence of tax policy, depreciation, depletion, and so forth. In the foreign field the problem has a number of additional aspects. Tax treatment of oil production varies widely between areas, and in a great many areas depletion is not recognized. On the other hand, a great many countries in which marketing, refining, and transportation are heaviest permit accelerated depreciation and grant investment stimuli through tax means to an extent very much greater than practiced in the United States. Self-financing is sometimes penalized by the practice of certain European and other governments imposing limitations on the price at which products can be marketed in their territories. However, for Europe as a whole, a recent report of the Oil Committee of the Organization for European Economic Cooperation has recognized that the only practicable means of meeting the heavy capital requirements in the years ahead will be to follow policies which will enable the oil companies to continue, and even to increase, the extent to which their own retained funds will furnish a major portion of the required expenditures.

The process of reinvesting earnings is not automatic. Just as new investment is the result of decisions on numerous basic considerations, so are the same type of decisions required for reinvestment.

Having made the decision to press forward with the large

scale investments needed for a balanced approach to meeting foreign oil requirements, the American oil investors can look to supplement reinvestment of cash earnings by financing either abroad, generally in the particular country where operations are being carried on, or in the United States. A large part of the outside funds required by American oil companies in refining, transportation, and marketing investment in Europe since the war have been obtained in the money markets of those countries. On the other hand, producing ventures and other operations often take place in areas remote from the capital markets, and require substantial capital investment. These problems must be considered country by country, and the considerations are very similar to the ordinary problem of corporate financing with which we are all familiar at home. We must look to proper capital structure for the particular enterprise, to recourse to short-term financing along conventional lines, and to consideration of local borrowing or equity financing. American petroleum companies have tended to operate with 100% or a very large ownership interest by the American parent companies, and this has limited recourse to local equity financing even where this might have been available. There are some notable exceptions to this generalization.

I should now like to consider the exchange problems confronting companies operating abroad. An American foreign investor whose shareholders are interested in returns to be received in dollars must give particular attention to payments arrangements. American oil companies operating abroad move large volumes of oil in international trade which never touch the borders of the United States; they make extensive investments in various facilities, and they must arrange their affairs so that each segment of their world-wide operations makes and receives appropriate payments for petroleum and materials shipped in international trade, for services rendered across international boundaries, and eventually for interest and amortization of principal on their loans and remittances of profits or dividends on their equity investments. When you consider that a large oil company may be operating in as many as fifty countries, each with its exchange problems and exchange regime, this brings up a great many technical problems. This is the more true because we are unfortunately living in a world in which it has not been possible since the war to have general convertibility, and in which some of the major countries are still subject to serious exchange restrictions and limitations, and in some cases discrimination.

The oil industry, because it deals in an essential commodity, is generally in quite a good situation in respect of foreign exchange payment problem. An interesting, as well as serious, problem confronted us in 1949 and 1950 namely "The Sterling Oil Problem". Because of our investments and our ability to demonstrate that we could furnish oil to the sterling area for little greater dollar burden than non-dollar oil companies, we were able to make arrangements with the British government under which we operate with no important restraint in the sterling area. We have also made arrangements in certain non-sterling area countries which permit us to operate without serious impairment. This is not an easy business, but by very careful and con-

stant attention to the handling of our operations to minimize dollar costs to consuming markets, we have been able to operate since 1950, and admittedly in a period of improving general balance of payments and exchange conditions, with no real disadvantage as compared with non-dollar oil companies. With respect to the Jersey Company, we have achieved adequate flexibility and fluidity in our financial remittances so that we have no blocked balances worthy of note.

Operations outside of the United States are subject not only to the variations of economic conditions in the countries in question which to some extent, at least, we can predict, but also to political and nationalistic actions taken by the people and governments of those countries which, being the result of human forces, are sometimes harder to predict. In most cases it has been possible to work out of these in a more or less satisfactory manner.

The oil industry has been confronted at some time or another with each of the special problems peculiar to foreign investment and has found that it is possible to arrive at a satisfactory solution. Consequently, our experienced management is one of the industry's great assets. With that management the American petroleum companies have been able to operate abroad successfully.

One measure of the success of the United States petroleum companies abroad is their return on investment. Figures of the Department of Commerce indicate that last year the United States oil companies earned about \$1¼ billion on foreign investments valued at \$5¾ billion. This indicates a rate of return of the order of 20%. Although attractive, I believe this rate is much more modest than is often assumed by those who fasten their attention solely on the rewards of some particular producing venture.

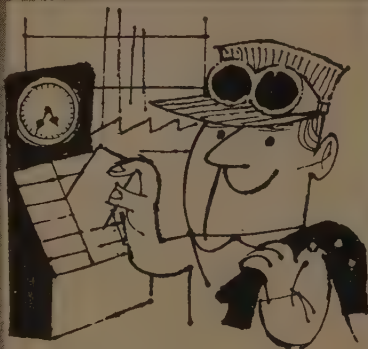
This emphasizes an important phase of the outlook for foreign investment in our industry. Profits in terms of rate of return on investment will tend to be reasonable rather than abnormally high. This I feel is dictated by economic forces and progressive business judgment, as well as the requirements of good public and governmental relations. Reasonable profit margins and the large growth in markets abroad should be reflected in gratifying increases in dollar profits for the petroleum industry.

In summary, we have seen that oil operations outside the United States require large investments in order to meet foreign oil demands. We have seen that a great part of these investments in fact will be financed out of cash earnings, but that a smaller but important segment will require recourse to local capital markets, and in many cases at least, to dollar investments in the form of equity or loans by the American parents. These investments are subject to all of the normal business uncertainties of investment in the United States—in the case of a producing venture not the least being the problem of actually finding oil and bringing it to the surface; and in addition, there are special problems arising in foreign operations. At the same time, United States oil companies have made attractive returns on their foreign investments and I feel that these returns should be augmented through the continued growth in demand for oil in the foreign field.



# Can you pass this IQ\* TEST?

\* INDUSTRIAL QUIZ



*Industrial & commercial wages & salaries in the Upper Midwest are four times farm income*

TRUE ☐ FALSE ☐



*Number of industrial & commercial employees has nearly doubled in the Upper Midwest since 1939*

TRUE ☐ FALSE ☐



*The backbone of Upper Midwest economy is diversification—both in industry and agriculture*

TRUE ☐ FALSE ☐



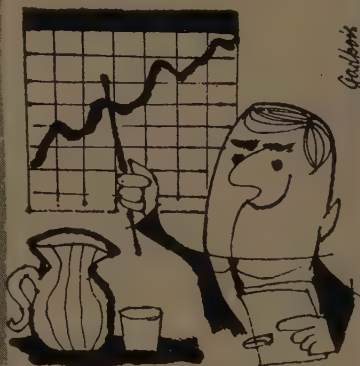
*The Upper Midwest has an almost unlimited supply of water for processing*

TRUE ☐ FALSE ☐



*KWH sales for Northern States Power Company have more than doubled in the past 10 years*

TRUE ☐ FALSE ☐



*NSP's gross operating revenues are 2½ times those of 10 years ago*

TRUE ☐ FALSE ☐



**ANSWER:** You were 100% right if you answered all questions as TRUE. The financial story of NSP is easy as ABC: (a) NSP is in the heart of a diversified industrial and agricultural area. (b) NSP has had 23 straight years of revenue growth. (c) NSP's sales come from sources that are least sensitive to any future business fluctuations.

Have your secretary write for a copy of our annual report. The 1956 report will be available March 30.

NORTHERN STATES **NSP** POWER COMPANY

Minneapolis 2, Minn.

*Serving a thriving area in Minnesota, Wisconsin and the Dakotas with electricity and gas*

## PUBLIC UTILITIES

# The Future of the Electric Utility Industry

HERBERT R. FRANKEL

*Managing News Editor, Electrical World*

**T**ODAY IN AMERICA THE ELECTRIC UTILITY industry is keeping well ahead of the demands. At the same time it is lowering the cost of electricity to make it more economical for new household applications.

By 1960 the population will be around 179 million and by 1970, there will be an expected 213 million. The number of households will increase to nearly 51 million by the end of 1957, a 24% increase over 1956. By 1960 it is estimated there will be 55 million households and by 1970, over 69 million. The electric power industry is serving nearly 46 million residential customers today or over 99% of all the homes in the United States. By 1960 well over 50 million will be served and by 1970, nearly 64 million.

Consumer disposable income will be around \$289 billion next year, 3% above 1956, \$325 billion by 1960, and \$463 billion by 1970. Now what is each consumer going to do with this extra income? For one thing, he is going to spend more of it for electricity. His \$78 bill this year will be 31% higher by 1960 and 138% higher by 1970. Naturally he will use more kilowatt hours. But how will he use them? Better lighting is one use; more appliances, and year-round air conditioning and house heating are others. The all-electric home will begin to become a reality.

### HUGE EXPENDITURE PREDICTED

To keep up with the increased needs of householders along with commercial and industrial demands, we predict that the electric utility industry will spend \$4.3 billion in 1957, 14% higher than 1956. By 1960 we predict \$5.6 billion and by 1970, over \$11 billion. Spending between 1956 and 1970 will triple.

The resulting capacity additions likewise will show substantial increases. Electrical World survey in September showed that an estimated 9.6 million kw capacity will be added in 1957, a 3.2 million kw gain over 1956's 6.4 million. This rate will increase so that by 1970 the industry will add capacity at the rate of 26.8 million kw of which 2.4 million is estimated to be nuclear energy.

These spending estimates are for the entire power industry, and total \$20.2 billion for the period 1957-1960. They are for power companies, municipal, state and power districts, cooperatives, and federal agencies. We estimate that the electric power companies are spending at the rate of about 75% of the total industry. If this 75% is applied to

the \$20.2 billion, these power companies will spend \$15.2 billion in the next four years. We estimate that about \$10 billion in "new money" will be needed by the companies. The balance will come from internal sources.

The industry is doubling every 8 to 10 years at present. Total energy kwhr sales were up 12.1% for the first eight months of 1956 over the same period last year. This compared with 16.2% a year ago. The drop was largely due to leveling out of power demands by Atomic Energy Commission installations. However, residential kwhr sales continued to increase and were up 12.1% this year against 11% a year ago. Peak load went to 94.8 million kw in July, a 6.2% increase over a year ago. Total output amounted to 458.6 billion kwhrs for the first 41 weeks of this year, 10.5% above a year ago. Eliminating the AEC use, output was up 7.9% over the same period of 1956.

### INDUSTRIAL CONSUMPTION INCREASING

The industrial load has been increasing at an accelerated rate. Taconite plants will be big users of electric power. AEC is using over 50 billion kwhr annually, over 10% of total sales for 1956. Aluminum and magnesium reduction use has now reached 32 billion kwhr. This is 6% of total sales. To all this we can add new uses for electric steel furnaces. Electric heating, heat treating, control devices, lighting, air conditioning, etc. are other loads that are being added at a fast rate.

Department stores, shopping centers, office buildings, and other commercial customers have accepted all-electric living. They have been installing brilliant lighting effects, complete air-conditioning, along with electric cooking, calculating machines, water and drink coolers and many smaller items. By 1970 we expect the average commercial customer to use around 32,000 kwhr, roughly 2½ times today's consumption. To show the tremendous growth in the commercial classification, we would like to cite the plans for an office building in that field, the Socony Mobil building across from Grand Central Station in New York. This building will have 1.6 million square feet of floor space. It will require 31 million kwhr during the first year of full occupancy. This is nearly 20 kwhr per year per square foot of office space.

The immediate future of atomic power is clouded by political considerations. It is, however, clear that in the



long run atomic power will definitely insure our keeping ahead of our ever-increasing power requirements. Public-power advocates will push for government built and financed nuclear power plants. We are now on a "knowledge plateau" as far as nuclear power reactors are concerned. We will not gain any substantial new insight into nuclear power reactors until several of them are built and operated. Nearly one million kw of atomic power is scheduled for operations by the end of 1960.

Costs are holding very well. An Electrical World survey of 54 steam stations in the United States in October, 1955, showed that 50% of the stations cost \$129 or less per kw of installed capacity to build and 70% cost about \$140 or less per kw. This is a bit below the per kilowatt cost of five years ago. Some reasons for the costs holding steadily are: larger generating units, higher pressures and temperatures, centralized control, and outdoor design.

There has been a steady decline in the operating ratio (fuel, salaries and wages, maintenance and other operating expenses to total revenue). In 1951 it was 48%. At the end of 1955 it was 44.4% and it is estimated it will be around 43.7% for 1956. The reason for this improvement is that fuel and salaries and wages took less of the revenue dollar because of more efficient and automatic operations. While further decreases may be expected, they will certainly not be as large as experienced from 1948 to date.

Electric house heating is being stimulated by the growth in air conditioning because utilities need this winter load to balance the summer demand.

Electricity as an economical heating source depends on the region, its climate, the price and availability of gas and fuel oil, and the insulation of the home. Electric heating is now being sold at between 1½¢ and 2¢ a kwhr in areas served by the electric utility companies. Proper insulation of the house is important in keeping down the cost of electricity. Industry is becoming more and more convinced that the price consideration is not so important as it might seem.

If we assume that there will be inflation we are sure that the utilities will press for such rate levels before state commissions that will preserve the integrity of the investment. It should be made clear to the state public service commissions that institutional investors are becoming more and more of a factor as to utility securities. These investors will study the comparative regulatory treatment of the companies and will buy and sell the securities accordingly.

The Comptroller General, in a study entitled "An Analysis of the Findings and Recommendations of the Comptroller General on the Federal Power Program" said: "Under present power rates the SWPA and the power phases of the related seven Corps of Engineers dams have incurred a net loss of \$13,425,531 from 1943 to 1955 and for SEPA and its related dams the loss has been \$12,096,483 from 1950 to 1955."

Let me remind you that there is hardly an industry whose future is as bright as ours. The only thing we need is a fair opportunity which can come only from public opinion and regulatory understanding. You, the industry, and ourselves can do much to attain this end.

---

## Natural Gas Utilities

PAUL KAYSER

*President, El Paso Natural Gas Co.*

THE MOST INTELLIGENT WAY to understand the natural gas utility business is to compare it with the electric utility business. Contrary to popular conception, electricity is not an energy resource. In every instance, electricity requires the expenditure of a natural energy resource to produce it. The electric business is engaged in the use of our energy resources for the production and distribution of electricity.

On the other hand, the natural gas business is engaged in finding and producing a natural resource and in distributing such natural energy direct to the consumer, in his homes, factories and into the boiler plants for the generation of electricity.

If you do not keep this distinction between the utilities in mind, it seems to me impossible to have a clear grasp of the function of the natural gas business.

These facts lead to certain other basic differences between the two utility operations. To use an oil field expression "gas is where you find it". For this reason, the great sources

of supply are widely scattered over the nation and far removed from the principal points of consumption. The greatest sources of supply today are in the Southwest and the Rocky Mountain area. To make these supplies available to market has required the construction of a multitude of long lines, 1500 to 2,000 miles in length from these sources of supply to the markets in New York City, Boston, Chicago, Seattle, Portland, San Francisco, Los Angeles. The transportation is generally carried out by separate pipeline corporations not connected with distribution except by long-term contracts. These pipe lines produce only a very small percentage of the product that they transport. Their supply is obtained generally by long-term contracts made with the producers of gas and these producers generally are the oil companies engaged in the exploration and production of oil in the particular areas where the gas may be found.

Transmission lines consist of more than 145,000 miles of pipe lines. They represent an investment of approximately

5 billion 200 million dollars. The distribution lines consist of more than 352,000 miles of pipe lines and represent an investment of 8 billion 600 million dollars. This system serves 28½ million customers with a total of 9.3 trillion feet of gas, the equivalent in heat value of 1.55 billion barrels of oil.

This is the greatest and most efficient transportation system for the delivery of a natural energy resource directly to the consumer the world has ever seen. No other system connects the consumer directly with the source of supply in the reservoirs where nature has stored it so that he effects delivery merely by turning the valve on his burner. In this manner it supplies the nation with 26% of its entire energy resources (including water power).

The most important single fact in respect to production is that gas must be found before it can be produced. The continuity of supply is wholly dependent upon the exploration effort that is needed to find it. No engineer, geologist or other scientist can tell where a given quantity of gas can be found and where it can be produced. Such are the hazards of the production of gas and the elements that enter into the ultimate distribution of this natural resource to the burner tip of the consumer.

#### NECESSITY FOR AGGRESSIVE EXPLORATION

The oil industry, over the past ten years, has constantly maintained approximately thirteen times current demand as an inventory against which to draw its supplies. Because the gas industry is built on long-term contracts, it seems to me it is more realistic for it to use a figure of twenty times current demand as a fair reserve or inventory to maintain.

If an inventory of 20 times current requirements is to be maintained, then it will be necessary to discover 200% of the net production each year. The net production for 1955 was 10 trillion 265 billion cubic feet. In order to maintain such net production, increasing at the rate of 5% per year, it would require the discovery of 200% of 10 trillion 265 billion cubic feet or 20 trillion 530 billion cubic feet of gas for such year.

Proven reserves of natural gas as of today are on a twenty-two year basis and that fact can be eaten into in order to relieve the situation. But, if it is not possible now to maintain a rate of discovery that will sustain a twenty year inventory-versus-demand, then it is a little optimistic to say that, when we have used our present excess reserves to sustain our position, we will be able five years from now to discover a sufficient quantity to sustain a twenty years' supply for the future against a rising demand of 5% per year.

The only point to making these figures is to bring in bold relief two outstanding facts: (1) that the maintenance of supply is dependent upon the success of exploration and (2) that the task of exploration in the future, with a rising demand at anything like 5% per year, is an extremely difficult task to be performed.

While the average depth of wells has steadily increased and the cost per foot has increased 60% in the last ten years, the statistics likewise show that the average amount of oil added to the nation's supply has steadily declined since 1945. Over the past ten or eleven years the risk in

drilling wildcat wells for new fields has been about eight-to-one, that is, one producer out of nine wildcats drilled. But the most heart-breaking fact in that connection is that only one well out of forty-four of these successful wildcats discovers a field with as much as one million barrels of reserves, and that nearly 98% of these successful wildcats are actually failures because the quantities of reserves discovered were too small on the average to be profitable. In addition, studies show that the size of fields being discovered is steadily declining.

All of these facts demonstrate that the costs of exploration are steadily rising and the rewards of the search are steadily declining.

#### INCENTIVES FOR EXPLORATION

The government long ago saw the wisdom of providing incentives to keep the proper flow of capital into this difficult search. One of those incentives is the right to charge off as an expense, for tax purposes, the so-called "intangible" drilling costs of a well. The word "intangible" is a misnomer when used in this connection because the costs that are charged off are just as much a part of the cost of the well as an element of cost of any project. The so-called "intangible" costs apply to the cost of the actual drilling of the well, labor, rental on equipment, and other incidental costs. The only costs not included in the so-called "intangible" costs are the costs of casing, tubing, valves and fittings necessary to drill and complete the well.

Another of the incentives that have been provided by the government is to permit deduction for income tax purposes of 27½% of the gross, not exceeding 50% of the net, from the income from a particular producing property as a depletion charge against the reserves.

These provisions were wisely adopted by the government more than thirty-five years ago and with these incentives the American oil and gas industry has built one of the greatest industries in the world and is now supplying the American economy with two-thirds of its energy resources.

#### THE POSITION OF NATURAL GAS

The necessity to discover additional volumes of reserves of natural gas in order to meet the rising demand is colossal in its nature. Until the last few years gas was strictly a by-product of oil. Building of long-line pipe lines has completely changed that to where now more than 28 million consumers are dependent upon this source for fuel and natural gas now supplies 26% of all the energy used to sustain our high standard of living.

Under these circumstances, simple intelligence demands that exploration for gas be conducted for its own sake. There must be a price at the point of production sufficient to stimulate the flow of capital into the search and to adequately compensate the producer for the increased costs and the risk involved.

#### GAS FROM COAL IN THE FUTURE

When the price of finding and developing reserves reaches the point where it is cheaper to make gas out of coal, then there will be a gradual change-over from natural gas to high BTU gas from coal. The gas industry is in an excellent position in respect to such policy.



If the law of supply and demand is permitted to operate, then, as the price increases in the field, it will reach a point where it is cheaper to produce the BTU's from coal and the pipe lines will be in a position gradually to substitute high BTU gas from coal for the declining supplies of natural gas so that gas service can be maintained to the economic limit of its usefulness.

The gas industry together with the coal industry, the oil industry and the Bureau of Mines has already conducted extensive experimentation for the purpose of establishing the feasibility of making not only high BTU gas from coal but all other petroleum and many chemical products as well. It has long been established that these products can be so made. A plant has recently been put in operation on a very large scale in South Africa to make these products from coal. The Company with which I am associated has sent research engineers to study the operation of this plant,

and our Company is planning a pilot plant of such size as to develop cost figures on volume production of high BTU gas. By putting the gas into the pipe line some of the cost of this research can be recovered from the project and it should be possible ultimately to develop production in such volume that it would pay its own way.

The economy must have the energy and unless some other cheaper form of energy is developed, then these plants will certainly be built at the mouth of the mine as the economic limit is approached in the exploration for and development of additional reserves of natural gas and oil.

In this way the energy now supplied by natural gas and oil will be made continuously available to sustain our great economy and such sources of energy will be situated wholly within the area of military control in case of war and at no time will the economy lose its efficiency nor become impotent in the face of hostile attack.

---

## The Outlook for Telephone Utilities

J. J. SCANLON

*Treasurer, American Telephone & Telegraph Co.*

THE 58 MILLION TELEPHONES in the United States are operated by some 4600 companies. Of this number, the 23 Bell System associated companies account for 49½ million telephones, or about 85% of the total. The remaining 8½ million telephones pertain to the independent sector of the industry, numbering nearly 4600 companies. Nearly half of these telephones are owned by five companies, the largest of which is General Telephone Corporation, which operates more than 2½ million telephones.

### RECORD POSTWAR GROWTH

We are looking at the telephone industry today at one point in what appears to be a prolonged period of tremendous expansion. This has been going on continuously since 1946 and is expected to continue undiminished for a considerable period in the future. The number of telephones in service in this country at the end of 1945 was 28 million, less than half the number in operation today. The daily volume of telephone conversations has doubled since 1945.

This expansion has taken place in response to a record-breaking demand for telephone service. The Bell System, as an example, entered the postwar period with a backlog of 2 million orders for telephone service, overloaded plant and service quality below the desired standards. In addition to the "catching-up" effort these conditions have required, the demand for telephone service has grown at a rate faster than the expansion of the economy as a whole. The number of households in the country has increased from 38 million to 48 million, while the proportion with telephone service has increased from 47% to 74%.

To provide for the increases in telephones and the additional facilities and circuits to handle the growing volume of long-distance calls, the industry has been engaged in a construction program which has increased its gross plant investment from \$6½ billion in 1945 to \$18½ billion at June 30, 1956. The industry's expenditures for new construction since the war will total well in excess of \$15 billion by the end of this year. It might be observed, in this connection, that the rate of growth for the telephone industry has been about twice that for the economy as a whole, and has been nearly twice as large as that of the electric utilities.

### FINANCING CONSTRUCTION A MAJOR PROBLEM

Financing this construction program has been a major problem for the industry, for the telephone industry, unlike manufacturing industry in general, must rely heavily on external financing to raise the funds needed for expansion. This point is seen on looking at the source of funds for financing the Bell System postwar construction expenditures, which will total some \$14¼ billion by the end of this year. Of this total, \$9½ billion, or 2/3rds, will have been raised through external sources of funds—sale of debt securities and equity capital. Depreciation accruals, reinvested earnings and other internal sources of funds have provided only one-third the amount needed. For industry as a whole, approximately three-quarters of the funds required in the postwar period has come from internal sources.

The magnitude of this financing program may also be

seen by comparison with total corporate external financing in the period 1946-1955, based on data published by the United States Department of Commerce. The telephone industry raised about 12% of the total capital, both debt and equity combined, obtained through external financing by domestic non-financial corporations in this period. As to equity capital alone, the telephone industry has probably accounted for more than a quarter of all equity capital raised publicly by United States corporations in the postwar period.

#### POSTWAR EARNINGS TRENDS

During the whole of the period since World War II, the fundamental factor of earnings rates has been a major concern of the industry. Earnings of the telephone companies during and after the war were at low levels, as a result of increased costs. It has been necessary to apply to regulatory authorities throughout the country for rate increases, and the continuing inflationary pressures during most of the postwar period made this an almost continuous process.

During the early postwar years the Bell System earned 5.1% on average invested capital. Earnings have improved since that time, reaching 6¾% in 1955 and are currently at about that level.

The recent improvement in earnings has been shared by most areas of the telephone industry. Telephone rates have risen only about 33%, on average since 1940, while costs have risen far more rapidly. The earnings improvement in the face of greater costs is a significant measure of the contribution made by improved methods, improved plant utilization, and technological advances. The earnings problem is ever-present, particularly now that the threat of rising costs has again appeared.

#### OUTLOOK FOR TELEPHONE BUSINESS

The telephone industry is in a period of strong and sustained growth, which may well continue for some years at about the present rates.

Of fundamental significance for the industry's future is the expected continued growth in population and in the number of new households. The population grew by 25 million between 1945 and 1955, and we may well add 27 million more by 1965. Penetration of the potential market is expected to continue. By 1960 some 80% of households will be equipped with telephones, and by 1965 this proportion may be as high as 85%, compared with the present 74% level. This trend will be reinforced by growing demand for additional telephones and other forms of telephone service on the part of present users.

On the other hand, several factors which have influenced earlier postwar telephone growth are not expected to maintain their previous relative importance. One is the shift in the distribution of income which took place during the war and postwar years, tending to accentuate the rise for lower income groups. A further redistribution of income does not appear likely in the degree previously experienced. The middle income groups will continue to increase relative to the total. Growth after 1940 proceeded from a level of partial under-employment of labor and resources, and this tended to accentuate the growth in demand. Similarly, war

restrictions limited the expansion of telephone service for private uses, and concentrated a good deal of deferred demand in a short interval following the war. Lastly, increases in prices and wages have resulted in a greater rise in personal income than in the cost of telephone service. It is to be hoped that we will not have another doubling of the price level through inflation.

An increase of about 3.3 million telephones is expected by the Bell System during the current year, and about 3.5 million in 1957. This compares with an average annual increase of 2.4 million during the previous ten years. However, extension telephones comprise about half the expected increase in 1956, and somewhat more in 1957, as compared with a proportion of about 1/3 in the 1946-55 period. Assuming a similar proportion of Bell System telephone additions to the industry's total, as in the recent past, the increase for the industry should be something over 4 million in 1957.

Long distance messages have been increasing rapidly and we expect a further gain in 1957, although at a rate somewhat lower than in recent years. An increase of about 6% is probable in 1957.

The Bell System will expend some \$2.2 billion for new construction in 1956, involving new financing of \$1.3 billion (more than \$100 million per month). Present plans for 1957 anticipate at least as much.

#### NEW DEVELOPMENTS

The aim of the telephone industry is always to do the job more satisfactorily, more efficiently, and more economically, both through present processes and through new tools for rendering service. Major gains in this direction necessarily stem from the work of the research laboratories and of the people working in the development aspects of the telephone business.

The ultimate objective in a long established program of service improvement is complete customer dialing of calls. Presently about 55% of long-distance calls are dialed to completion by the originating operator.

Customer dialing of long-distance calls is rapidly progressing. 13% are now dialed through to completion by the customer. This nationwide dialing by customers has already been introduced in 226 exchanges enabling some 2½ million customers to dial their own calls to about 20 million telephones in 15 distant metropolitan areas in addition to dialing their short-haul calls. Nationwide customer dialing will be available to about 5.5 million customers by end of 1957. The nationwide switching plan requires a large and complex network of switching centers. Machines at these centers do everything required to complete the connection to the distant telephone.

#### MODERN ACCOUNTING EQUIPMENT

Accounting equipment capable of assembling billing data is another necessity. This equipment punches all pertinent information on a paper tape, which is then sent into the accounting office where other machines interpret and prepare the billing slip. These recording devices already are in operation in many newer offices and also are being adapted for use in older dial central offices.



A very new development aimed at reducing costs and improving service is the electronic central office switching system. The trial of the first electronic switching system is planned for Morris, Illinois, in early 1959 where it will serve about 4000 customers.

This system will employ all-electronic devices with no moving parts, in contrast with our present systems, which employ electrically operated mechanical switches. Where our present switches have operating times measured in seconds or thousandths of a second, the elements in the new electronic system will operate in the order of a millionth of a second. This tremendously fast operation does not sacrifice reliability, and, because of its speed, fewer units of equipment will be required to serve an exchange of standard size.

The key part of the all-electronic system will be the transistor. The transistors, as well as the other elements which will be used are very small in size, so small as to make considerable space savings possible. This, coupled with the fewer units of equipment needed because of the faster operation, will result in savings in building space.

Another feature of electronic switching systems will be their large capacity for cheap memory. Memory is the programming or logic built into the system. This capability will allow new services to be introduced which from a cost standpoint would be prohibitive with our present systems.

#### INTEGRATED DATA PROCESSING

Data transmission is an area in which the industry must stand ready to meet the communication requirements resulting from outside developments. The job of computers is to process data quickly. Transmission of data involves sending intelligence merely by means of a series of making and spacing electrical pulses. These pulses represent codes, consisting of "binary digits," the contraction of which is "bits", a term used to designate a unit of information. The present teletypewriter system, which uses a standard 5-bit code, is limited by most teletypewriters to sixty words per minute or about 45 bits per second. The teletypewriter channel is limited to a speed of about 75 bits per second, although it is capable of carrying codes of higher order, that is, having larger numbers of "bits."

The various communication channels, teletypewriter, telephone, and television, are capable of carrying the 6, 7, or 8 bit codes used in most electronic computers. But the

question is, "Can the information be transmitted as fast as it is processed by the high speed machines?" Actually the industry's facilities can offer transmission speeds to meet almost any data requirement. Telephone channels can speed up to about 750 bits per second, and television channels can transmit some 50 million bits per second.

For many years, the industry has utilized devices for multiplying the number of conversations carried on a single pair of wires. These devices, known as "carrier" systems, consist basically of equipment which employs different frequencies referred to as "space" division for the various conversations carried. In recent years this principle has been advanced through the use of coaxial cables to the point where some 1800 simultaneous conversations can be carried over a pair of coaxial tubes. Recently experimental work is going ahead on a wave guide, a hollow tube or pipe, capable of carrying hundreds of thousands of conversations at the same time. Heretofore, however, all of these systems have had their primary application to the longer haul circuits. For the shorter haul business, the cost of the equipment required to provide additional message paths has exceeded the cost of the copper wires themselves. The introduction of the transistor, and other solid state devices, has opened the way to development of carrier equipment which can be applied economically to short-haul circuits. This will be a radically different system which, in basic principle, will involve sampling of the speech frequencies at very frequent intervals and then transmitting these samples on a coded basis in pulse form (similar to the pulse transmission for data processing). The pulses are decoded at the distant end of the circuit and the amplitudes of the original speech frequencies restored. The potential advantages include "time" division of the channels, i.e., utilization of periods of momentary idleness and successful transmission on cheaper channels. Though this system is still in the early stages of development, it promises an important economical solution to the problem of providing additional voice paths to meet the rapidly growing volume of short-haul traffic.

While I have talked mostly about financial and economic matters and physical things, I would like to emphasize that people, in research, in manufacturing as well as in operations, are the really important element in this business. I also hope that I have left some impression of the highly dynamic physical characteristics underlying the telephone industry.

#### ELECTRIC BOND AND SHARE COMPANY

NEW YORK, N. Y.

##### Notice of Dividend

The Board of Directors has declared a quarterly dividend of thirty-one and one-quarter cents (31¼¢) per share on the Common Stock, payable December 28, 1956, to shareholders of record at the close of business on December 7, 1956.

B. M. BETSCH,  
Secretary and Treasurer

November 15, 1956.



#### UNITED FRUIT COMPANY

230th

Consecutive

##### Quarterly Dividend

A dividend of seventy-five cents per share on the capital stock of this Company has been declared payable Jan. 15, 1957, to shareholders of record Dec. 7, 1956.

EMERY N. LEONARD  
Secretary and Treasurer  
Boston, Mass., November 19, 1956

#### CONSOLIDATED NATURAL GAS COMPANY

30 Rockefeller Plaza  
New York 20, N. Y.

DIVIDEND No. 36

THE BOARD OF DIRECTORS has this day declared a regular quarterly dividend of Forty-Seven and One-Half Cents (47½¢) per share on the capital stock of the Company, payable February 15, 1957 to stockholders of record at the close of business January 15, 1957.

R. E. PALMER, Secretary  
December 20, 1956



*Every 24 hours, 3800 common carrier trucks move 60,000,000 pounds of freight in and out of St. Louis!*

## St. Louis - 2nd largest truck terminus - at the center of U. S. highways!

Union Electric's home city is host to 50,000 trucks a day! Their giant transport volume, plus that of St. Louis' 18 trunk line railroads, makes the city the busiest land transportation crossroads in the U. S.

Also at the *center* of the world's largest inland waterways system, a St. Louis area location offers you the opportunity to reach more quickly *all 160,000,000 people* in America—*at low freight and shipping costs!*

Other reasons why a St. Louis area address puts you in the country's most *centralized* operating position:

- Center of U. S. population—less

than 150 miles away, moving steadily closer.

- Center of one of the country's most skilled diversified labor pools—evidenced by the fact that 76% of all industries classified by the U.S. Census Bureau are found here.
- Close to the source of abundant fuels—oil, coal, gas, as well as raw materials from farms, forests and mines.
- Central point for power. Union Electric's system, with metropolitan St. Louis as its hub, can supply electric service to meet the largest industrial requirements

either in the metropolitan area or in more than 150 attractive smaller cities and towns in our area stretching from Fort Madison, Ia., to Flat River, Mo., from East St. Louis and Alton, Ill., to Jefferson City, Mo.

### **LOOK AT THE NEW ST. LOUIS**

Find out more about how the nation's most diversified industrial area has become one of the *most civically progressive* as well. For information, please address: J. E. Johanson, Industrial Development Engineer, 315 N. 12th Boulevard, St. Louis 1, Missouri.



## Union Electric System

Comprising Union Electric Company • Missouri Power & Light Company •  
Missouri Edison Company • Union Colliery Company • Poplar Ridge Coal Company







## SEEING EYES FOR SCULPTORS OF METAL

A BILLION battles take place daily as America's machine tool operators watch their super-hard precision cutting tools shape reluctant metal to industry's needs . . . with an accuracy as close as one ten-thousandth of an inch.

Oil carries away the heat of these battles . . . flowing constantly over the friction-heated cutting tools to save them from destruction.

Here Texaco Research has made a vital contribution. Once all cutting oil was opaque. The operator could not

see his work. Then Texaco developed the first *transparent* cutting oil. Now the machinist could *see* the tools in operation, control them with greater accuracy, guard against the waste of imperfect workmanship.

Texaco Research has scored "firsts" in many fields. Its highly-developed manpower and facilities work in many ways to serve all industry everywhere.

THE TEXAS COMPANY



**TEXACO RESEARCH**—always ahead

## TRANSPORTATION

---

# Piggyback's Brilliant Future

ROY FRUEHAUF  
*President, Fruehauf Trailer Co.*

**W**E ARE ENTERING THE ERA of cooperative transportation. Piggyback is not something new or experimental. It is a long-established and well-known method of transportation. The really big swing to Piggyback began in 1952 and is continuing today and into the future with the full momentum of very rapid growth. More than 36 railroads in the United States and 2 in Canada are carrying on this service. This opens a new era in transportation. I believe that the Piggyback development can be as big in its meaning to transportation as was once the invention of the locomotive and as big as the original development of the highway system and the highway truck and trailer.

Piggyback is a combination of two very unlike services, the highway trailer and the railway freight train, a combination which produces the best features of both. It reminds me of that tasty Chinese dish, "sweet and sour pork."

### INDIVIDUALIZED SERVICE

Trailer transportation on the highway has always been distinguished for directness and flexibility. Trailer transportation is an individualized service. It takes things straight from where they are to where you want them. Yet railway transportation is mass transportation. The railroad combines dozens, or even scores, of shipments into one massive unit of movement, the long freight train. Putting a trailer on a flatcar appears at first sight like trying to mix oil and water. You may ask: What is the meaning of this strange combination?

The answer is: Piggyback provides for the shipper the tailor-made service of the highway trailer. And in providing this service, it supplies a growing volume of profitable business for both the motor carriers and the railroads. Let me take a moment to draw a picture for you of the better-known service of the trailer moving over the highway and to compare this benefit with shipments by the conventional railway box car. Thus I will make the meaning of Piggyback clearer.

First of all, you load the highway trailer at your door. And you can load the box car at your door too, if you are on a siding. But, from there on the two have little in common. While you are still waiting for a switch engine to come and pick up your box car, the trailer is heading for the local terminal to pick up an intercity driver and from

there it moves straight for the open road. Where does the box car go? It has to be incorporated into a train, so it heads for a classification yard. The box car stays right in town.

The railroad's feature is mass transportation. Your box car stays in town being made up into a train, hooked on to 50 or 100 other fellows' carloads. Sometimes the railroads accomplish this in six hours. But, they may need sixteen hours or even 48 hours. In the meantime, before your box car has left town, the trailer load is already delivered to your consignee hundreds of miles away. After the freight train gets going, it has to stop and switch individual cars on and off at intermediate points. Trailers do not. At interchange points, freight trains have to be broken up, your box car switched through a second system of classification yards and onto the connecting line. Trailers do not. At destination, freight trains have to go through still another system of classification yards. Trailers do not.

On LCL shipments, the contrast is even greater. In addition to all these delays, the shipment has to be packed and crated for individual handling, moved to a freight depot by local truck, and loaded into a box car before the process I have just described can even begin.

Shipments of aluminum and steel travel from Cleveland to Louisville, Kentucky, by rail in anywhere from three days to five days. They spend most of this time in classification yards in Cleveland, Cincinnati, and Louisville. But, they go by highway in sixteen hours, for delivery the next morning.

### SPEED ESSENTIAL

We all know the amazing record of the growth of trailer transportation. Why is this? It is because America cannot wait. The products we buy and sell are getting more highly styled. We cannot build up big stocks to fit a slow transportation system. As the nation gets richer, more and more of our products are high valued. More of them are highly processed and finished, from frozen pies and fresh orange juice to electric typewriters. We cannot wait. We tie together dozens of branch factories, each one synchronized with the other as to designs, processes, and schedules; we tie them together with high speed communication systems and electronic office machines. Today's decision in Detroit is tomorrow's production in Cleveland and Louisville. And



the materials have to be in Cleveland and Louisville so the work can get done. Individualized transportation is the answer. Highway trailer shipment. We cannot wait.

The Piggyback system meets the needs of this growing, dynamic America. The Piggyback railroad train operates much like a passenger train. The passenger train does not run its payload of passengers through switching and classification yards. The whole train is made up empty, made up in advance before loading. Then it is pulled into the station, and the paying cargo gets aboard and heads for the club car for a drink. Once the cargo is aboard, the passenger train pulls straight out of town. Mass transportation. But, no classification yards and no switching. The train leaves New York at 5:00 p.m. for next morning delivery of passengers in Chicago at a quarter to eight. Why not move freight this way, too? This is what Piggyback does.

The Piggyback train is really a passenger train hauling freight. The trucking company takes the loaded trailer from the shipper's dock straight to the railroad terminal. Once the flat cars are fully loaded with trailers, the locomotive is attached and the train moves directly out of town. No classification yards, and very little switching. When it gets to its destination, the Piggyback train pulls into the terminal. There it is met by truck-tractors, just like taxicabs meeting a passenger train. Each tractor takes its trailer directly over the streets to the consignee. Here is a service equivalent to highway shipment, but operated on the mass transportation principle.

#### COMBINED SERVICE

This combines the tailored service of the highway trailer with the economy of rail transportation. A trailer shipment over the road will get a consignment from Chicago to New York for second morning delivery. So will Piggyback. From Chicago to Pittsburgh, first morning delivery. Trailer shipment over the road eliminates classification yard delays. So does Piggyback. Trailer shipment does away with rehandling of merchandise in freight depots and thereby simplifies packaging and crating. So does Piggyback.

In the Piggyback service, loss and damage rates are the lowest in history. After promoting and building its Piggyback service vigorously for three months, one large western railroad reported that it had yet to receive its first loss and damage claim on this service. In the longer run, loss and damage on Piggyback service runs as low as a third of a cent per dollar of revenue, less than one-third the average claims against ordinary box car shipment. So, here is a service in all respects equivalent to the high speed service of over-the-road trucking, a service tailored to the needs of the individual shipper who cannot wait for the conventional methods of railroad freight.

#### A PROFITABLE BUSINESS

But Piggyback is still a mass transportation service with mass transportation economy. This makes Piggyback a profitable business, profitable for the motor carrier and profitable for the railroad.

In a hearing with respect to the service of the Chicago Great Western Railroad, the Interstate Commerce Commission pointed out that certain factors tend to make Piggy-

back service less costly than regular rail freight. The Commission cited less terminal handling, less empty movement, and less clerical and accounting expense. The railroad gets 50 per cent on the movement of empty trailers. By contrast, on an empty box car the railroad gets nothing. With respect to the Piggyback service of the Pennsylvania Railroad, the Commission has reported that out of 550 comparisons of Piggyback earnings with regular rail freight earnings, all except 27 produce greater revenues per car-mile from Piggyback service than from regular carload rates. Average car-mile earnings reported in the exhibit of the Pennsylvania Railroad were 74 cents, in comparison with fully distributed costs of less than 46 cents. For the railroads Piggyback is a highly profitable operation.

Let us not forget, too, that this profit is obtained on a reduced investment. A railroad dollar invested in Piggyback equipment produces lots more revenue in a year than a dollar invested in conventional equipment.

This is because one Piggyback unit, two trailers on a flat car, hauls so much more freight in a year than a box car does. The average box car, with all its switching and standing around, covers an average of only 46.5 miles per day. In 1954, the average freight car spent only 2½ hours per day actually moving in trains. Now, it takes a lot of box cars to move freight this way. By contrast, a Piggyback movement will cover 300 miles in an overnight run. This is six times as much distance as the average box car covers. Furthermore, trailers spend less time moving empty. In one large Piggyback operation less than 8 per cent of the trailers move empty. But, over 35 per cent of railway freight cars move empty. This takes more box cars, too. Covering six times the mileage of the typical railway car and running 92 per cent loaded, a much smaller fleet of trailers and flat cars can move the same traffic and move it faster and with less damage. This means a reduction in investment to handle any stated amount of traffic, a reduction of around 34 per cent, and on 100 million ton miles of business, this adds up to enough to buy three diesel-electric freight locomotives of the most popular type at 1954 prices, with over \$80,000 left over. Piggyback business is profitable to the railroads, and it saves investment funds.

#### GROWTH PHENOMENAL

Just two years ago, the railroads had enough specialized flat cars in service to carry 600 trailers. A year later, this number had multiplied four-fold to 2,400 trailers. By February, 1956, this number had more than doubled again to 5,250 trailers. In addition to these specialized flat cars, there are unknown thousands of standard flat cars in Piggyback service. These are not as economical. As Piggyback grows, costs will come down. New equipment, especially suited to this form of transport will be installed. Labor saving devices will be put to work.

Piggyback is growing fast. And, as it grows, it becomes more economical. It gets better. In due time it will replace practically every box car in the country and the time is coming when all the freight now carried by the nation's fleet of 719,000 box cars will be moved instead by trailers moving on flat cars.

Piggyback brings the railroads and the motor carriers into a profitable partnership. When the momentum of rapid Piggyback growth got under way some three or four years ago, many people asked: "Where is this business going to come from? Who is going to lose traffic?" This was natural enough. But, we know, now that nobody is losing traffic to Piggyback. Let us not forget first of all, that the yearly job of transporting the nation's production is a growing job. The ton-miles of freight hauled by railroads and motor carriers combined grew by more than 2.5 per cent per year from 1950 to 1955. That is over 24 per cent in ten years to 1960. As the transportation industry faces up to this growing volume of traffic, the question is not: "Who is going to grab this from whom?" but: "How can we carry most efficiently this addition to the traffic load?"

We in the transportation business are learning, too, that there is no fixed amount of traffic in the country to be fought over and divided between the various agencies. Bet-

ter service and fair rates mean more business for everyone.

You have probably heard the expression "fishyback," the carrying of trailers on ships and barges. For many years, the deep water coastal trade, known as the "break bulk" traffic, has been suffering from the high costs of loading and unloading. Coastal ships have to stop frequently at closely spaced ports. The new roll-on, roll-off principle offers a solution to this problem. But time is limited, and this story will have to wait for another occasion.

In the meantime, we at Fruehauf are proud of the part we are playing in the transportation revolution now going on, of the trailers hauled by locomotives in long trains, and of the trailers going to sea in ships. We are proud to belong to the team of motor carriers, of railroads and of waterway operators who make up together the most dynamic system of continental transportation in the world. But, most of all we are proud to be partners in this new formula of cooperative transportation, the Piggyback system.

---

## Rail-Highway Cooperative Freight Service

EUGENE F. RYAN  
*President, Rail-Trailer Co.*

**I** WAS DELIGHTED TO LEARN of your Society's interest in trailer-on-flatcar developments. The holding of this forum is an impressive tribute to their significance, and may well contribute to their future progress.

Rail-Trailer is the outgrowth of a new approach to an old idea.

For twenty years there was a lot of talk about the advantages of rail-highway coordination, but, as Mark Twain said of the weather, no one did very much about it.

Our company was formed in 1952, after several years of intensive study and planning had led to the following conclusions:

1. There is a practical, businesslike approach to rail-highway freight service which can produce a billion dollars of new revenue annually for the railroads, on a basis of mutual profit to themselves and the truckers, and the time is ripe for its adoption.

2. The most logical partners of the railroads in this new approach to coordination are the motor common carriers, who have built a multi-billion dollar annual business on a fast, flexible and complete freight service geared to the needs of modern industry.

3. The development of a successful working relationship between the railroads and the motor carriers, and the performance of certain important phases of this service, such as terminal operations and equipment leasing, can best be accomplished through an independent agency specializing in these activities.

From the beginning, Rail-Trailer's effort has been aimed

at the solution of economic and psychological problems involved in developing a successful rail-highway freight service. This called for the adoption of new financial and operational concepts in both industries. In the case of the railroad, for example, fast special trains were required to match or surpass highway operating schedules. This has served to dramatize the time factor in relation to the production of revenue, and its significance from the standpoint of railroad earnings and return on investment. In the case of the motor carriers, trailer-on-flatcar service has led to departures from conventional practice with regard to line-haul operations and the use of leased equipment.

Specifically, the Rail-Trailer Company is engaged in the following activities:

- (1) The development and presentation to railroads and motor common carriers of a complete program for trailer-on-flatcar service between specific points. This involves the determination of traffic potentials, proper charges for the service, train schedules, terminal facilities, and flatcar and trailer requirements.

- (2) The negotiation of contracts between railroads and motor common carriers, and between each of those agencies and the Rail-Trailer Company covering the establishment of trailer-on-flatcar service.

- (3) The performance of the following phases of this type of service: (a) Solicitation of trailer-on-flatcar business from motor common carriers; (b) Operation of trailer-on-flatcar terminals; (c) Leasing of truck trailers to motor carriers and railroads for use in this service; (d)



Participation in the leasing of flatcars to railroads for the movement of truck trailers.

#### RAILROAD-MOTOR CARRIER TRUCTRAIN SERVICE

Last month, a record total of 4,800 motor common carrier trailers moved on the TrucTrains and accounted for some three-fourths of their total lading. Much of this traffic is handled in solid trainloads over the full length of the system between New York and Chicago or St. Louis. The service network also includes Philadelphia, Pittsburgh, Indianapolis and Cleveland. From the time this operation began, in March 1955, through October 1956, a total of 43,000 motor common carrier trailers have been transported.

The average motor carrier trailer trip in this service is over 800 miles, and produces around 22c per mile or \$180 for the Pennsylvania. This means about \$800,000 of gross revenue in October, an annual rate of nearly \$10,000,000.

While I am not in position to measure the profitability of this new line of business to the railroad, there is every reason to believe it is a money-maker.

With two trailers on each car, the railroad's gross revenue of 44c per car mile with a minimum of empty mileage is higher than the overall average revenue per total car mile in railroad freight service which yields a substantial profit. Railroad expenses in motor carrier trailer-on-flatcar service are relieved of traffic solicitation and pickup and delivery costs which are borne by the highway carriers. There is very little switching or yard operation. Loss and damage is almost nil.

As every transportation analyst knows, the line-haul cost of moving a large volume of freight over a long distance is lower by rail than by highway. Under the proper traffic conditions, the railroad can line-haul the motor carrier's trailers at a price which is profitable to itself and which provides a saving to the motor carrier. This is the economic essence of TrucTrain service on the Pennsylvania. The service is performed under a contractual arrangement between the railroad and the motor carriers which has no effect upon the existing freight tariff structure of either party and which poses no regulatory problem.

#### MORE EFFICIENT AND PROFITABLE

If a clincher is needed in support of the motor common carrier approach to trailer-on-flatcar service, it can be found in the equipment utilization and revenue productivity of this operation. The cars in the New York-Chicago TrucTrains, for example, which cost about \$12,000 each, are making better than 300 miles per day. At 44c per car mile this means an annual gross revenue of more than \$40,000 per car. The average conventional freight car travels about 45 miles a day, now costs around \$8,900, and produces an annual gross revenue of less than \$5,000.

Steady progress is being made in the efficiency of terminal operations, which have been handicapped by the lack of modern labor-saving equipment for the security of a trailer to a flatcar. This problem has been overcome through a research project undertaken by The Rail-Trailer Co., the Pennsylvania Railroad and American Car & Foundry Division of A.C.F. Industries, which has resulted in the de-

velopment of a semi-automatic stanchion to replace the present tie-down equipment. The new stanchion, like Rail-Trailer's present tie-down system, will handle any conventional trailer without application of special attachments to the vehicle. This means that hundreds of thousands of trailers designed strictly for highway operation can be freely used and interchanged in flatcar service, which is of vital importance to the development of this business.

From the standpoints of available traffic volume, traffic balance, utilization of equipment and revenue potentialities, however, no other form of trailer-on-flatcar service can compare with the railroad-motor common carrier operation. I believe that widespread acceptance of this fact by leaders of the transportation industry is close at hand. If this proves to be the case, we can look forward to a material strengthening of the railroad and highway common carriers' position in the national economy.

#### INVESTMENT ASPECTS OF T.O.F.C. SERVICE

*Railroads:* The rapid growth of TrucTrain service on the Pennsylvania reflects the progressiveness of its management in offering the service and price attractions required to develop motor carriers patronage.

If this policy continues, and I am confident that it will, I believe the Pennsylvania's revenue from this service will multiply several times over in the next few years. Because of the favorable earning characteristics previously mentioned, the successful future development of this business could lead to a substantial increase in the railroad's net income.

Similar benefits should accrue to other strategically situated railroads which can provide fast train service for motor common carriers between large and widely separated centers of population.

*Trailer Train Company:* In the area of equipment financing, the formation and future growth of Trailer Train Company will lead to the shifting of a certain amount of freight car financing from individual roads to the car pool organization. The first step in this direction has already been taken by TTX, with excellent results, through the cooperation of Salomon Bros. & Hutzler in arranging the financing of its present fleet of 500 cars.

By way of explanation, Trailer Train Company is a private car leasing agency organized early this year by the Pennsylvania Railroad, Norfolk & Western Railway, and The Rail-Trailer Company. Its purpose is to help individual railroads meet problems of car supply, distribution and financing involved in the performance of trailer-on-flatcar service on a national scale, and to achieve the most efficient use of equipment.

In addition to the three original stockholders, the membership of Trailer Train Company now includes the Missouri Pacific, Missouri Kansas & Texas, St. Louis-San Francisco, Burlington, Wabash and Boston & Maine railroads. Several other railroads are considering the advantages of participation.

*Motor Carriers:* For motor carriers using the rail-lift, the future holds promise of some reduction and greater stability

of line-haul costs, and new traffic potentialities in cooperative service.

Already there is evidence of closer working arrangements between motor carriers for the purpose of developing opportunities presented by this new service.

To the extent that truck trailers or containers used in the various flatcar services are leased from Rail-Trailer Company, there will be a centralization of ownership and financing similar to the Trailer Train Company development in the railroad car field.

The long range effect of trailer-on-flatcar progress in the case of the motor carriers will include improved earnings, a stronger working capital position, and a generally higher investment rating for the principal operators.

*Suppliers:* The interest of investment analysts in the future of trailer-on-flatcar transportation of course will extend into related fields such as the manufacture of equipment, which I know will be very ably discussed by Mr. Fruehauf.

One of the objectives of The Rail-Trailer Company is to develop an arrangement that will permit the financing of a major portion of truck trailer investment costs directly in the money market, rather than through the builders. This we believe would contribute to a logical and economical transition of trailer financing which would be equally welcome to the manufacturers.

Basically we feel that truck trailers ought to be financed through the same channels as railroad equipment and on generally comparable terms. Trailers are good collateral, both as to earning power and resale value. They are amortized more rapidly than railroad cars, and trade-ins frequently bring capital gains. Credit losses of the principal manufacturers over an extended period of years have been almost negligible.

*Shippers:* Transportation practices of certain large shippers, such as the meat packers, may be revolutionized by the use of trailers and containers on flatcars with beneficial effect upon their profit margin.

If this is accomplished, it will be through reduction of handling and warehousing costs, and improvement in quality of product at the point of sale.

Before closing these remarks, I would like to discount the popular impression that trailer-on-flatcar service is the answer to traffic congestion on the highways.

The scope of the trucking industry is so great, and its growth trend is so strong that we must expect a continuing increase in the number of trucks on the highways, alongside of rapid expansion in trailer-on-flatcar service, for many years to come.

I might add, in this connection, that our forecast of a billion dollars in new revenue for the railroads from this service, which we believe is attainable within ten years, would be fulfilled by the handling of only about one-fourth of the total motor common carrier line-haul traffic to be expected at that time. The other three-fourths of this traffic, still moving on the highways, will be far in excess of the present carrier volume.

In conclusion, it is clear that the financial community will play a vital role in the future development of cooperative rail-highway freight service.

The cumulative equipment financing requirements of this type of service could easily approach the two billion-dollar mark within ten years, in the form of 50,000 long flatcars, or their equivalent, plus 300,000 trailers and containers.

Through your contacts with railroads, motor carriers, suppliers and others concerned with this development you will surely contribute to its advancement in many ways.

---

## Railroad-Operated Trailers

H. W. VON WILLER  
*President, Erie Railroad Co.*

THE ACTUAL HANDLING of highway vehicles on railroad flat cars is not new. In fact, this method of handling goes back at least in an organized way, to 1926 when the Chicago, North Shore and Milwaukee Railroad established the service between Chicago and Milwaukee primarily for the movement of less-than-carload traffic. This was followed in the middle 1930's by other midwestern lines. In 1938 an operation was started by the New Haven Railroad between New York and Boston and other New England points.

The real impact of piggy-back came in 1954. The timing evidently was right. Interest of common carriers, both truck and rail, is growing daily and its large-scale development has captured the public's fancy, and certainly its growth and

future prospects have loomed important to all security analysts with whom I have been in contact.

No discussion of piggy-back service would be complete without a short description of the various types. In order that we can properly analyze its development and to be sure of just what we are discussing, I would like to break piggy-back transportation into three categories.

*Group One:* The wholly railroad-operated. By that I mean the transportation of commodities moving on rail-published rates and minima in railroad trailers with the collection and delivery service and the over-the-road service being handled entirely by the railroad.

*Group Two:* The handling of common carrier truck



trailers where the common carrier performs the collection and delivery service, and the rail lines perform only the line-haul service.

*Group Three:* The service where the trailer is furnished by the shipper; the terminal service at both origin and destination points is performed by the shipper; and the line-haul is performed by the rail line.

Most of my discussion will be limited to Group One as, up to now, that is where I have had the experience. However, as this forum progresses, I reserve the right of expression as to Groups Two and Three.

Before addressing my remarks to the question we have been asked to discuss, I would like to make clear my views; first, on piggy-back in general; and, secondly, on the wholly Rail-operated Plan and on the Common Carrier Plan.

It is clear to me that piggy-back transportation is a definite step forward and that, from the standpoint of economics and logic, it has a permanent place in our transportation field.

Also, it is clear that all three groups; namely: the wholly Railroad-operated, the Truck Common Carrier Plan, and the Shipper Trailer Plan can be operated on the same railroad at the same time.

#### QUESTIONS TO BE ANSWERED

Edgar Mead, who arranged this discussion, posed 8 questions which, in his words, "he wanted answered". I will give you my views with the hope that they will be helpful in arriving at a better answer.

1. When will it become really profitable for railroads and trucks?

The wholly-operated railroad piggy-back service is, if you will consider each individual movement and the expenses incident to that individual movement, profitable. If, however, you include all costs, including idle trailers, idle equipment, it is my experience that we are about at a break-even point. Of course, volume is the answer and as the volume increases, the wholly rail-operated piggy-back service will be a profitable operation.

As to the profit accruing to the common carrier trucks, I would assume that those who have entered into the substituted rail movement have had a profit by way of reduced unit costs. Otherwise, they would have no interest.

2. To what extent does piggy-back encourage new business?

Over 90% of the Erie's piggy-back traffic is new business as for the first time our sales organization has a method of meeting over-the-road competition from both a minimum weight standpoint and from the standpoint of equality of price. In addition, the industry with no rail siding has been brought to the rails. This potential is quite large.

3. Can this become a common meeting ground for common carrier trucks and the railroads?

These developments will be most helpful and might

bring into being at some future date transportation companies interested in doing an over-all transportation job which will fit the buyer's need regardless of the type of service or carrier.

4. What techniques appear to be most successful?

My experience on Erie is limited to regular 40-foot flat cars which handle one trailer, and to the 75-foot flat cars handling two trailers with regular tie-down arrangements and circus-type loading. We have experimented with the type of car which utilizes loading of trailers on the car center sill and have found it entirely satisfactory.

5. Which looks likely to have the most success of the three basic systems?

The answer is dependent on the point of view. Earlier I indicated that all three could live, and undoubtedly would, on the same rail line and this may be the eventual outcome with each method supplying a particular economic need.

6. Legislation affecting piggy-back?

Present legislation is satisfactory insofar as the three plans discussed are concerned. There is some demand by freight forwarders that they be permitted to use piggy-back service under individually negotiated contract rates rather than under the tariff rates paid by other shippers. Senate Bill 3366 and H.R. 9548 were introduced in the 84th Congress but never came to a vote.

7. Labor factors?

We have found labor factors no problem. Those that have come into the picture from the Common Carrier Truck Plan evidently are being overcome.

8. Ability to finance piggy-back systems?

This is only a part of the over-all railroad financial picture which could be greatly improved if the railroads were given the opportunity to earn a fair return on investment. The actual expenditures will be substantial as the volume increases. The principal need will be new cars, adequate terminals, additional trailers, ramps and other devices.

9. Give information about the present and possible business for the future.

Erie's wholly rail-operated piggy-back plan has been growing steadily since its inception and will continue to grow. The extent of the growth can best be illustrated by the knowledge that we started with a single operation between Chicago and New York, and today, approximately two years later, we serve a total of 976 points. This is only the beginning.

In so far as the common carrier piggy-back service is concerned, it too has come a long way and there is no doubt that its potential is tremendous.

#### GROWTH OF PIGGY-BACK TRANSPORTATION

All types of piggy-back transportation have shown regular and constant growth, and I am sure they have a splendid potential and a fine future.

If I have succeeded in stimulating your thinking and have created questions in your minds, I am pleased.



**SOARING  
EVER  
HIGHER**

More oil... more fuel to run a world that turns on internal combustion engines. Here is a major challenge for 1957... and it entails an obligation for all the petroleum industry.

Looming large in the effort to meet new needs is Tidewater Oil Company's great new 130,000 barrel-a-day Delaware Flying A Refinery. To utilize to the full its enormous capacity, new super-tankers are being delivered to Tidewater's already impressive fleet. To bring its new and improved products to a waiting public, hundreds of new service stations have been opened.

The end result is a major contribution to the industrial and economic might of the nation... and all the Free World.



**TIDEWATER OIL COMPANY**

SAN FRANCISCO • HOUSTON • TULSA • NEW YORK





# Book

## APPRAISAL AND VALUATION MANUAL 1956-57

American Society of Appraisers

\$15.00, 516 pp.

This latest Manual is completely new and contains essential material for correct appraisals. Among important contributions is an attempt to solve "valuation of the atomic age." There are in addition to this over forty new technical studies.

A wide range of topics is covered, each the work of an expert. Analysts can find not only new tools and methods but novel bits of thinking which should bring answers to several important questions. "Appraising a Going Business," by Clifford L. Swan, is likely to develop ideas for determining the value of a corporation. Some basic principles indicate the soundness of a corporation. Included among them are competition, location, management, real estate holdings and the competitive position of the company.

Depreciation covered by Stuart Kosters is probably one of the most important contributions for public utility analysts. Herein the methods for reaching an exact rate of depreciation are defined, describing not only method but procedure. In Horace Perry's report are the purposes of depreciation, with highlights on basic principles. If this is read concurrently with the pages by Frederick Babcock, "Definitions of Depreciation," it should be advantageous to every analyst. For the most part, these articles deal with utilities, yet the ideas they raise embrace all appraisals.

Myron Matthews tells where the largest gains in construction have taken place. He lists barometric items of building materials and what impacts may be expected. Two major components of construction costs are materials and labor. But movements of prices differ in districts. The articles on construction are of great merit.

"Considerations Affecting Value in an Industrial Atomic Energy Enterprise," by Benjamin Silverman, should be given due consideration. It will be

*In this department are summarized books, articles, and documents of outstanding economic or financial interest.*

*Helen Slade is the author of the book reviews. She will cooperate with members of the Society desiring source material for JOURNAL articles and for research projects and studies.*

of considerable importance to students searching for golden atoms. The Manual contains a bibliography which includes a guide to legal decisions and written works by other specialists.

## YOUR BUYING GUIDE TO MUTUAL FUNDS AND INVESTMENT COMPANIES

Leo Barnes

American Research Council  
Larchmont, N. Y.

\$12.50, 208 pp.

This book, written for the investor, his needs and safeguards, spotlights the best buys in the field of mutual funds and gives reasons for and against each suggestion.

After an examination and evaluation of the benefits which may be achieved by the purchase of shares of Mutual Funds and Investment Companies, Leo Barnes has produced a comprehensive study. It lists both disadvantages and advantages of these companies and aids the reader to select shares best suited to his needs. A method for appraising funds and deciding which offers the highest income yield, the most certain capital preservation, tax savings, or speculative gain is explained.

Of importance to both the professional and novice is the fifteen page table at the end of the book. "Table

13—Buying Information on Mutual Funds" shows each company's reinvestment privileges, size, sales charges, minimum purchases and insurance plan. Having this information on hand will cut hours of research. Coupled with this are Mr. Barnes' answers to questions pertaining to the special worth of a selected group or industry, its leverage and sources of gains.

The growth of mutual funds as a means of investment has been notable. For the smaller buyers they permit complete diversification, supervision of holdings by highly trained experts, and wise selection of holdings. Investment goals of individual buyers are considered, as are the merits present and future of many funds.

## CHEMICAL PROCESS ECONOMICS IN PRACTICE

Edited by J. James Hur

Reinhold Publishing Corporation

\$3.95, 115 pp.

Papers presented under the auspices of the Philadelphia-Wilmington Section of the American Institute of Chemical Engineers and the School of Chemical Engineering, University of Pennsylvania hold an educational stimulus not only for the young but for the experienced. For this reason they were collected and edited by J. James Hur.

Mr. H. P. Kulp stresses the importance of being "familiar with cost and economic information." After he indicated the kind of accounting best suited to this industry came L. C. Knox's report on "Plant Investment." There are four areas into which the elements that constitute total cost fall. First is the charges covering actual cost of material and labor inside the physical boundaries of the unit. The second is direct cost of "offsites." This distinction is thought to be useful. The third includes "all those charges that the contractor incurs," aside from direct material and labor. And the fourth is costs "peculiar to the process itself."

# Reviews

A. E. Lawrence wrote on the cost of services and H. R. Moody of Plant Operating Costs. "What Price the Chemical Product" by F. Flaxon Ogden has interesting charts and tables illustrating sales prices and profits. J. C. Martin's "Economic Analysis" also has interpretive tables and charts. They build the data into material from which one can make deductions and stress the usefulness of accurate data.

The paper written by W. J. Price and Karl Finsterbusch on financing the plant asserts that financing needs an expanding business. "Financing is based on the general financial strength and credit of the company and not on the value of the plant." In this industry it requires projection rather than record of achievement.

That these lectures were well received is understandable. They bring much information in book form, but it is too bad an index was not included.

## SPEAKING OF INVESTMENTS

Townsend Scott

Huntingfield Projects, Baltimore  
63 pp.

This is a little volume with happy illustrations. It is gay and simple without any technical phraseology. "It is believed that readers will find it interesting, instructive and amusing." To which one might add few can peruse these pages without emerging cheered because they have become informed. For the novice one can say there is no better introduction to financial thinking.

The author discusses types of investments, and goes so far as to make corporation statements seem friendly and simple. He gives definitions and stock market terminology. He paints a picture of good judgment that easily fits into most peoples' manner of thinking. For all who desire to follow an analyst's directions and comprehend that which he says, this book is of great benefit.

## YOU CAN MAKE MONEY ON THE STOCK MARKET

Everett J. Mann

This book is designed for the lay investor and especially for the man who has limited capital.

Emphasis is put on "timing" as well as value. And the author brings comfort by saying that through errors one will gain judgment. Terms and procedures are well defined. And the evils of inflation explained.

The Stock Market is said to be "an amalgamation of investors' and speculators' fears, hopes, frustration, disillusion, and expectations." Nevertheless if the principles given in the book are understood and the teachings followed the reader is likely to be able to reach more intelligent decisions and be "one of many who can make money on the stock market."

## BUSINESS PRACTICES, TRADE POSITION, AND COMPETITION

Oswald Knauth

Columbia University Press  
\$3.00, 181 pp.

Business practices, says the author, are usually responses to situations to which "a solution must be found by management." The result is man-made and complicated. This calls forth degrees of protection or legislation. Some kinds of protection are advantageous. Attention must also be given to the decline of an entire industry, which may be mitigated by diversification within the industry. This means that executives must be vigilant. Examples are stated of corporations whose managements are unprogressive "and unfruitful."

It is intelligent to concentrate on maintaining an equilibrium among all components, not merely on profits.

"The theory, then, of business practice is that from a balanced wise interplay of all the elements involved, including innovation, a satisfactory and expanding productivity results." There

is a possibility that from innovation disruption of certain segments might arise. Obsolescence increases loss, yet temporary losses should be considered normal under a changing economy. One helpful force is a sympathetic government, for it can hamper the industry by interpretations having "no relation to the facts and necessities of business practices."

## CORPORATE DEBT AND THE STOCKHOLDER

Louis O. Foster

The Amos Tuck School of  
Business Administration  
16 pp.

When one finds a pamphlet made possible by a grant from the Alfred P. Sloan Foundation it brings great admiration for foundations as a whole. This particular study is not only well done but beautifully edited. It may be had on request to the author at the Amos Tuck School, Dartmouth College.

Virtually all corporations borrow. Some go into debt because they prefer that method of financing. Others, though they try to get out of debt as rapidly as possible, find it more expedient than equity financing. No matter what the size of corporate debt, there is a method by which a company can determine the effect of a particular loan on the return to a company's stockholders. To do this requires an altered approach to both the balance sheet and statement. In the new system one "distinguishes among sources of capital on the basis of the price to be paid for their use"—or how much they cost the corporation. These "sources of assets" are classified as non-cost, interest cost, prior cost, prior-dividend cost, and common stockholders' equity. Computations used are novel.

The effectiveness of borrowed funds to different corporations is rather startling and of exceeding interest to analysts who must suggest to management when and how to borrow for the benefit of the shareholders.





## FINANCIAL STATEMENT FOR THE YEAR ENDING DECEMBER 31, 1956

### WALTER E. HELLER & COMPANY

#### AND SUBSIDIARIES

#### ASSETS

Cash .....	\$ 19,473,203
Notes, Accounts Receivable and Factored Accounts .....	\$166,813,737
Less: Balances Withheld ..	\$28,221,377
Reserve for Losses ..	2,839,666
Unearned Discounts ..	4,107,057
Net Receivables .....	\$131,645,637
Prepaid Expenses, Etc. ....	\$ 827,806
	<u>\$151,946,646</u>

#### LIABILITIES

Notes Payable, Unsecured .....	\$ 61,625,000
Accounts Payable including Taxes .....	8,172,787
Long Term Notes Payable .....	57,783,333
Minority Interest in Subsidiary .....	2,048,957
Capital Stock .....	7,501,991
Surplus .....	14,814,578
	<u>\$151,946,646</u>

#### 10 YEAR COMPARATIVE FIGURES

	Capital				Net Income	Cash Dividends Paid on		Common Stock*		
	Total	Preferred	Common	Surplus		Preferred	Common	Earned per Share	Dividends Paid per Share	Book Value per Share
1947	7,940,867	3,687,572	656,882	3,596,413	659,957	190,493	262,752	.54	.30	4.90
1948	8,237,703	3,662,021	656,882	3,918,800	801,823	187,408	295,597	.71	.34	5.27
1949	8,546,057	3,640,344	656,882	4,248,831	811,779	186,151	295,597	.72	.34	5.66
1950	9,726,701	4,122,043	722,572	4,882,086	1,282,874	196,368	387,561	1.25	.45	6.46
1951	11,190,022	4,868,526	867,088	5,454,408	1,361,723	247,471	397,414	1.29	.46	7.29
1952	12,269,781	4,782,000	867,088	6,620,693	1,559,406	245,028	476,898	1.52	.55	8.63
1953	17,387,816	6,431,800	1,137,236	9,818,780	2,071,582	265,396	702,977	1.59	.72	9.63
1954	18,740,739	6,369,300	1,165,552	11,205,887	2,413,997	332,716	917,178	1.79	.80	10.61
1955	20,231,263	6,306,800	1,195,866	12,728,597	2,722,640	329,905	1,127,268	2.00	.95	11.64
1956	22,316,539	6,244,300	1,257,691	14,814,578	3,130,800	326,657	1,371,519	2.23	1.10	12.78

\*Giving effect to a 2 for 1 stock split in August, 1955, and to stock dividends of 20% in January, 1952, and 10% in July, 1950.

### WALTER E. HELLER & COMPANY *Established 1919*

105 WEST ADAMS STREET, CHICAGO 90 ★ 342 MADISON AVENUE, NEW YORK 17


**FINANCING FOR INDUSTRY** This company serves manufacturers, distributors, processors and wholesalers desiring financing service auxiliary to their regular commercial banking connections.

★ ACCOUNTS RECEIVABLE FINANCING ★ FACTORING ★ REDISCOUNTS ★ INSTALLMENT FINANCING ★  
INDUSTRIAL FINANCING ★ INVENTORY AND EQUIPMENT LOANS ★ TELEVISION AND MOTION PICTURE PRODUCTION LOANS

CONSECUTIVE  
QUARTERLY DIVIDEND  
NO. 226

The Board of Directors declared a regular quarterly cash dividend of 50 cents a share on Common Stock outstanding, payable March 29, 1957 to stockholders of record March 11, 1957.

E. J. DWYER, Secretary  
and Vice-President  
February 7, 1957

 **THE  
ELECTRIC STORAGE BATTERY  
COMPANY**

**SOUTHERN  
NATURAL GAS  
COMPANY**

Birmingham, Alabama

**Common Stock Dividend No. 72**

A regular quarterly dividend of 50 cents per share has been declared on the Common Stock of Southern Natural Gas Company, payable March 13, 1957 to stockholders of record at the close of business on February 28, 1957.

H. D. McHENRY,  
Vice President and Secretary.

Dated: January 19, 1957

**GOOD YEAR**

**DIVIDEND NOTICE**

The Board of Directors today declared the following dividend:

60 cents per share on the Common Stock, payable March 15, 1957 to stockholders of record at the close of business February 15, 1957.

The Goodyear Tire & Rubber Co.  
By Arden E. Firestone,  
Secretary

January 7, 1957

**THE GREATEST NAME IN RUBBER**

**REGULAR  
QUARTERLY  
DIVIDEND**

The Board of Directors has declared this day  
**COMMON STOCK DIVIDEND NO. 88**  
This is a regular quarterly dividend of

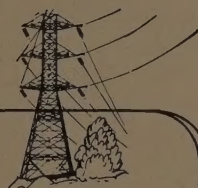
**25¢ PER  
SHARE**

payable on February 15, 1957,  
to holders of record at close  
of business January 19, 1957.

H. Edwin Olson

Vice-President and Secretary  
January 3, 1957

**THE COLUMBIA  
GAS SYSTEM, INC.**



**Southern California  
Edison Company**

**DIVIDENDS**

The Board of Directors has authorized the payment of the following quarterly dividends:

CUMULATIVE PREFERRED STOCK,  
4.08% SERIES  
Dividend No. 28  
25½ cents per share;

CUMULATIVE PREFERRED STOCK,  
4.24% SERIES  
Dividend No. 5  
26½ cents per share;

CUMULATIVE PREFERRED STOCK,  
4.88% SERIES  
Dividend No. 37  
30½ cents per share.

The above dividends are payable February 28, 1957, to stockholders of record February 5. Checks will be mailed from the Company's office in Los Angeles, February 28.

P. C. HALE, Treasurer

January 18, 1957



**DREWRY'S**

A quarterly dividend of forty (40) cents per share for the first quarter of 1957 has been declared on the common stock, payable March 11, 1957 to stockholders of record at the close of business on February 27, 1957.

Drewrys Limited U. S. A., Inc.  
South Bend, Indiana  
T. E. JEANNERET,  
Secretary and Treasurer



**INTERNATIONAL  
HARVESTER  
COMPANY**

The Directors of International Harvester Company have declared quarterly dividend No. 167 of fifty cents (50¢) per share on the common stock payable January 15, 1957, to stockholders of record at the close of business on December 14, 1956.

GERARD J. EGER, Secretary

**The American Metal  
Company, Limited**

COMMON STOCK

Dividend No. 125

The Board of Directors has declared a dividend of Thirty cents (30¢) per share on the Common Stock payable March 1, 1957 to stockholders of record at the close of business on February 19, 1957.

H. VOGELSTEIN,  
Vice President and Treasurer.

*Harbison-Walker  
Refractories Company*

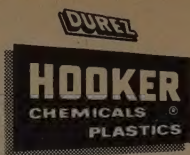
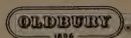
Board of Directors has declared for quarter ending March 31, 1957, DIVIDEND OF ONE AND ONE-HALF (1½%) PER CENT or \$1.50 per share on PREFERRED STOCK, payable April 19, 1957, to shareholders of record April 5, 1957.

Also declared a DIVIDEND of 70c per share on COMMON STOCK, payable March 1, 1957, to shareholders of record February 11, 1957.

G. F. Cronmiller, Jr.,  
Vice President and Secretary

Pittsburgh, January 31, 1957.





ANOTHER YEAR OF  
EXPANSION AND DIVERSIFICATION

## HOOKER ELECTROCHEMICAL COMPANY

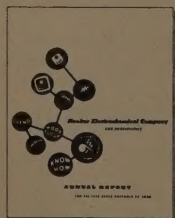
### Reports for 1956

Consolidation of Oldbury Electro-Chemical Company into Hooker brought us additional experienced personnel, new plants, new products in the phosphorus and chlorate chemical field and new markets, further increasing our diversification.

Construction is nearing completion at the new \$12 million caustic-chlorine plant of our Canadian subsidiary, Hooker Chemicals Limited. Our other plants were expanded. Total plant investment at the year-end was about \$125,000,000.

Through Hooker research, new processes were developed and new products, both chemicals and plastics, were introduced.

Combined sales totaled \$109,980,000. Earnings per common share equaled \$1.75.



#### Detailed Annual Report,

including a  
six-year summary of the

combined companies, will be sent on request. Please write to Secretary, Hooker Electrochemical Company, 31 Forty-seventh St., Niagara Falls, N. Y.

### HIGHLIGHT REVIEW

*Combining Hooker, Durez, Niagara Alkali and Oldbury*  
**Fiscal Years Ended November 30**

#### RESULTS OF OPERATIONS

(In thousands of dollars except for per share data.)

	1956	1955
Net sales of chemical products and services .....	\$109,980	\$104,275
Plus: Other income .....	1,874	846
Equals: Total income .....	\$111,854	\$105,121
Less: Our costs of doing business .....	88,730	82,041
Including:	1956	1955
Employee wages, salaries, payroll taxes and benefits .....	\$25,942	\$24,523
Raw materials, power, transportation, fuel, local and state taxes, other costs .....	55,619	51,013
Depreciation on buildings, equipment .....	\$7,169	6,505
Leaves: Profit before income taxes .....	\$ 23,124	\$ 23,080
Less: Federal income taxes .....	11,627	11,703
Leaves: Net profit .....	\$ 11,497	\$ 11,377
Less: Cash dividends .....	6,415	5,991
Leaves: Balance of profit for year retained for use in our business .....	\$ 5,082	\$ 5,386

#### FINANCIAL POSITION—Fiscal Year End

Current assets .....	\$ 42,739	\$ 39,635
Less: Current liabilities .....	10,841	7,984
Leaves: Working capital (net current assets) .....	\$ 31,898	\$ 31,651
Ratio of current assets to current liabilities .....	3.94 to 1	4.96 to 1
Total assets .....	\$122,870	\$112,270
Less: Total liabilities .....	44,073	38,569
Leaves: Net worth (shareholders' equity) .....	\$ 78,797	\$ 73,701
Which is represented by:		
\$4.25 Cumulative Preferred Stock .....	5,000	5,000
Common Stock .....	32,295	32,285
Capital surplus paid-in .....	7,304	7,300
Profit retained in the business (earned surplus) .....	34,198	29,116

#### PER SHARE DATA

Earnings per common share .....	1.75	1.72
Annual dividend rate per Hooker common share .....	1.00	1.00
Book value per common share .....	11.42	10.63

### HOOKER ELECTROCHEMICAL COMPANY AND SUBSIDIARIES

Niagara Falls, N. Y.  
Tacoma, Wash.

Montague, Mich.  
Columbus, Miss.

North Tonawanda, N. Y.  
Kenton, Ohio

Spokane, Wash.  
North Vancouver, B. C.





Additional life found by Sinclair in the 40-year old Garber Field is signified by the "Christmas tree" valve (left) which harnesses a newly completed deep flowing well. To the right stands a pump

still lifting oil from one of the original shallow wells. In the background at far right a derrick marks the site of additional deep drilling in the rejuvenated field.

## Old Faithful of the Oil Fields

### "Garber..."

This was a magic name in 1916, the year the new-born Sinclair company discovered the Garber Field, about 100 miles west of a booming town called Tulsa.

In its first 40 years, Garber produced *more than 60 million barrels* of oil for Sinclair.

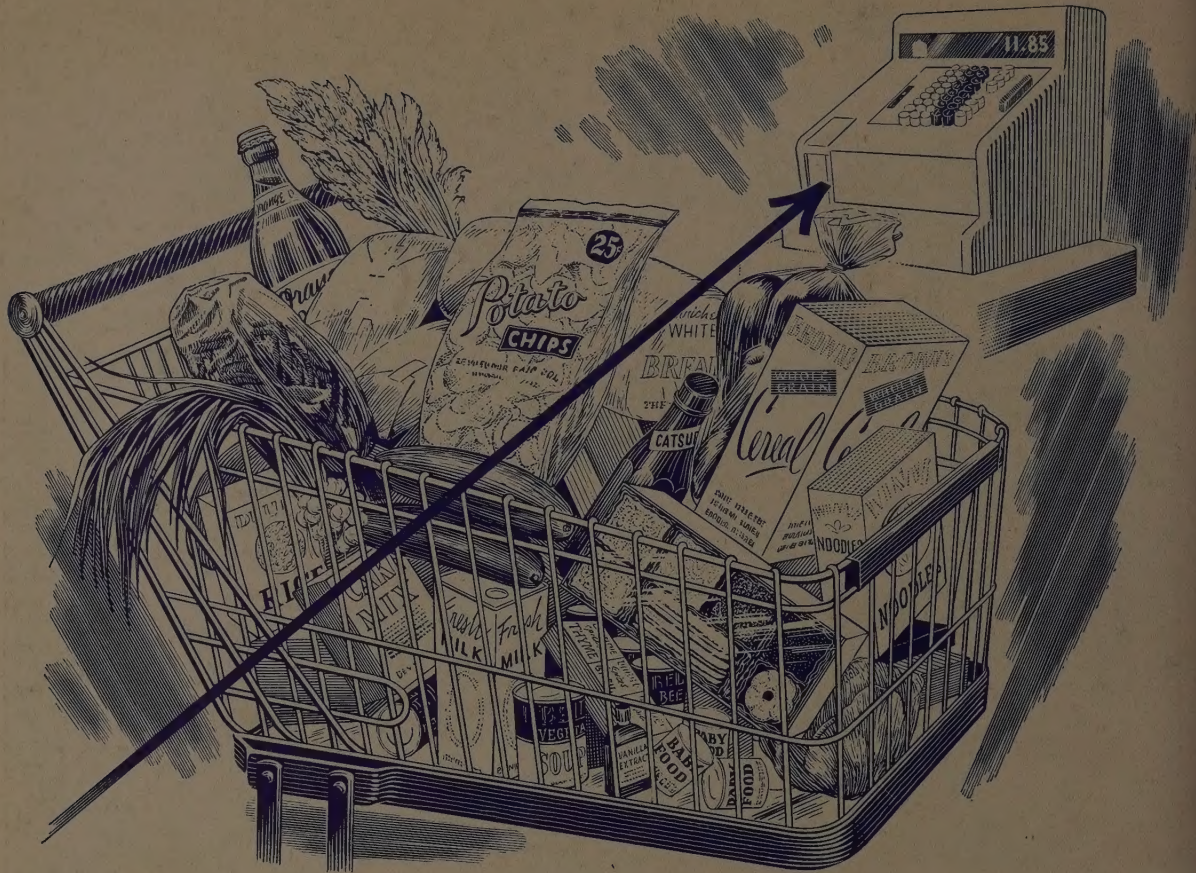
Late last year Garber again leaped into oil country headlines. After long, geological study, Sinclair Oil & Gas Company found additional deep-trapped oil in a field that many thought had passed into history. And

Garber should continue to produce for many years to come.

Sinclair's production of crude oil is increasing sharply. And significant new fields found over the past few months in the Louisiana Offshore area, in Venezuela, in Texas, Oklahoma and New Mexico and in the Rocky Mountain area give promise of still greater future production.

**SINCLAIR**  
*A Great Name in Oil*





## How Glidden is growing with the spectacular rise in food sales

Lined up at the check-out counters of food markets all over America are carts that are filled annually with 42 billion dollars' worth of good things to eat. This is  $2\frac{1}{2}$  billion dollars more than just three years ago!

To help satisfy this ravenous appetite for more and better foods requires many sources.

From the Glidden Chemurgy Division, for instance, comes lecithin. A soybean derivative, it is used as an emulsifier in bakery products and margarine; also in chocolate coatings and ice cream. Even dog foods and animal feeds contain large quantities of Glidden soybean products.

The Southern Chemical Division obtains ingredients from the pine tree which contribute to food, sugar and beverage processing. Titanium dioxide, an ultra-white pigment from the Chemicals-Pigments-Metals Division, helps make better paper for labels and packages.

Coatings for the inside and outside of cans to protect foods and beverages are produced by the Glidden Paint Division. And stores are kept invitingly bright, and plants spotlessly clean with Glidden finishes.

Durkee Famous Foods makes margarine, salad products, shortening, oils, spices, extracts, coconut and condiments—products with a 100-year reputation for quality—found on food counters everywhere. Durkee is also a large supplier of bulk shortenings and specialty products for many food processors as well as for the confectionery and bakery trades.

The part Glidden plays in the spectacular rise in food sales is typical of the way Glidden grows—through helping improve products, develop new ones or reduce costs for the industries Glidden serves. The Glidden Company, Cleveland 14, Ohio.



### DURKEE FAMOUS FOODS

For Food Processors;  
Restaurants; Consumers

### CHEMURGY

Soybean Derivatives;  
Grain Merchandising

### SOUTHERN CHEMICAL

Naval Stores;  
Terpene Chemicals; Resins

### PAINT

For Consumers; Product Finishes;  
Industrial Maintenance; All Surfaces

### CHEMICALS - PIGMENTS - METALS

Pigments and Metal Powders  
for Industry